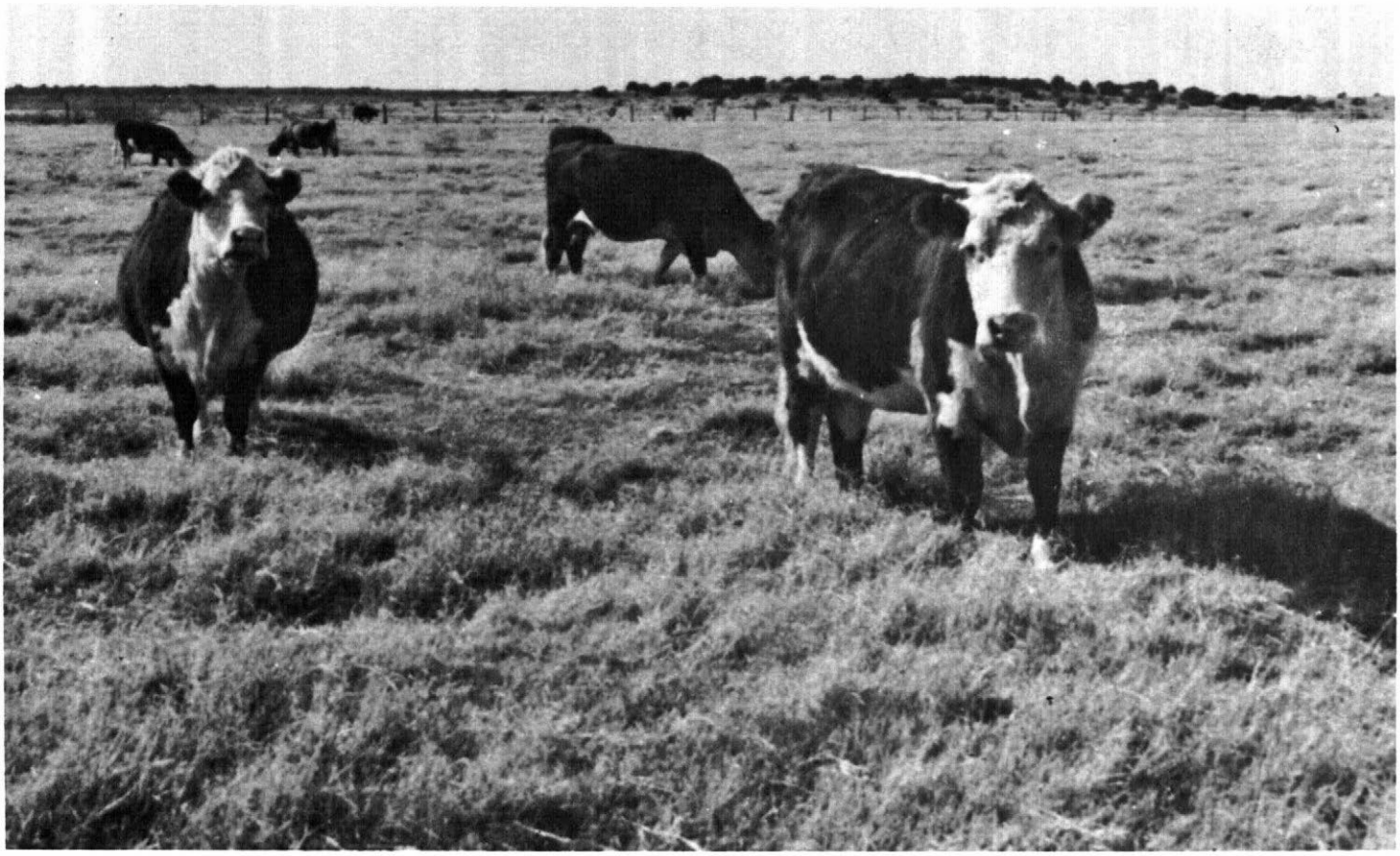
SOIL SURVEY OF

Scurry County, Texas



United States Department of Agriculture
Soil Conservation Service
In cooperation with
Texas Agricultural Experiment Station

Issued October 1973

Major fieldwork for this soil survey was done in the period 1959–64. Soil names and descriptions were approved in 1965. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1965. This survey was made cooperatively by the Soil Conservation Service and the Texas Agricultural Experiment Station. It is part of the technical assistance furnished to the Upper Colorado Soil and Water Conservation District.

Either enlarged or reduced copies of the soil map in this publication can be made by commercial photographers, or they can be purchased on individual order from the Cartographic Division, Soil Conservation Service, United States Department of Agriculture, Washington, D.C. 20250.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms and ranches; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All the soils of Scurry County are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all the soils of the county in alphabetic order by map symbol and gives the capability classification of each. It also shows the page where each soil is described and the page for the capability unit and range site in which the soil has been placed.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay on the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussions of the capability units and range sites.

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Use of Soils for Wildlife."

Ranchers and others can find under "Use and Management of Range," groupings of the soils according to their suitability for range, and also the names of many of the plants that grow on each range site.

Engineers and builders can find, under "Engineering Uses of the Soils," tables that contain estimates of soil properties and information about soil features that affect engineering practices.

Scientists and others can read about how the soils formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in Scurry County may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "General Nature of the County."

Cover: Hereford cattle on bermudagrass pasture. The soil is Olton clay loam.

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SOIL SURVEY OF SCURRY COUNTY, TEXAS

BY MARVIN L. DIXON, WILLIAM H. DITTEMORE, JR., AND HAROLD W. HYDE, SOIL CONSERVATION SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, IN COOPERATION WITH TEXAS AGRICULTURAL EXPERIMENT STATION

SCURRY COUNTY, in the western part of Texas, is in the southern part of the Great Plains area (fig. 1). The county covers about 909 square miles, or 581,760 acres.

Snyder, the county seat, is on U.S. Highway 84, about 85 miles southeast of Lubbock. Snyder serves a productive livestock, farming, and oil-producing area.

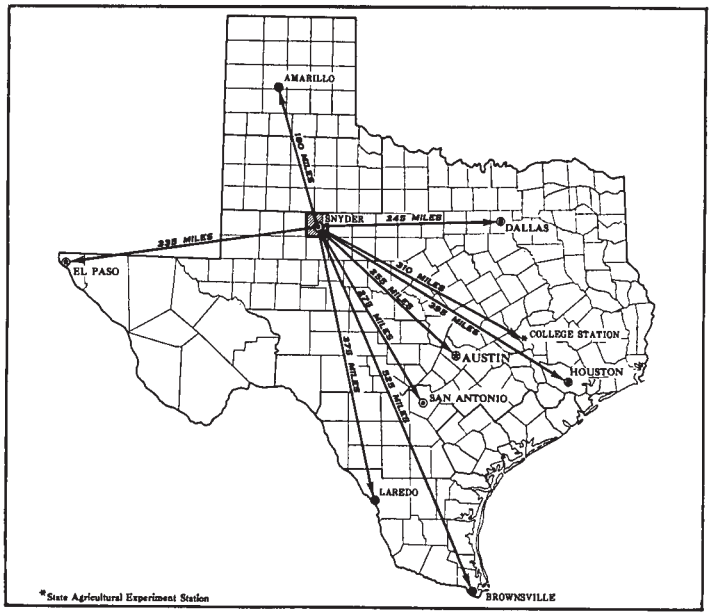

Figure 1.—**Location of Scurry County in Texas.**

Parts of the county consist of rough, broken areas. The rest is made up of nearly level to gently sloping soils. Ranching and farming are the main enterprises. Cotton and grain sorghum are the principal cultivated crops.

How This Survey Was Made

This survey was made to learn what kinds of soil are in Scurry County, where they are located, and how they can be used. Soil scientists went into the county knowing they likely would find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes; the size and speed of streams; the kinds of native plants or crops; the kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The soil series and the soil phase are the categories of soil classification most used in a local survey.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Abilene and Miles, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Miles fine sandy loam, 0 to 1 percent slopes, is one of several phases within the Miles series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. Two such kinds of mapping units are shown on the soil map of Scurry County: soil complexes and undifferentiated groups.

A soil complex consists of areas of two or more soils, so intermingled or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. The name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Mansker-Potter complex is an example.

An undifferentiated group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils, or of two or more. The name of an undifferentiated group consists of the names of the dominant soils, joined by "and." Colorado and Spur soils is an example.

In most areas surveyed there are places where the soil material is so rocky, so shallow, or so severely eroded that it cannot be classified by soil series. These places are shown on the soil map and are described in the survey, but they are called land types and are given descriptive names. Rough broken and stony land is a land type in Scurry County.

While a soil survey is in progress, samples of soils are taken, as needed, for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soil in other places are assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil. Yields under defined management are estimated for all the soils.

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in such a way as to be readily useful to different groups of users, among them farmers, managers of rangeland, and engineers.

On the basis of yield and practice tables and other data, the soil scientists set up trial groups. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others; then they adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under current methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Scurry County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide in managing a watershed, a wooded tract, or a wildlife area, or in planning engineering works, recreational facilities, and community developments. It is not a suitable map for planning the management of a farm or field, or for selecting the exact location of a road, building, or similar structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

The five soil associations in Scurry County are discussed in the following pages.

1. *Rowena-Abilene-Olton association*

Deep, nearly level to gently sloping, well-drained, moderately slowly permeable, loamy soils

This association (fig. 2) consists of broad areas of nearly level to gently sloping soils. It occupies about 40 percent of the county. The association is about 51 percent Rowena-Abilene complex, about 33 percent Olton soils, and 16 percent minor soils.

The Rowena and Abilene soils are brown and dark grayish-brown clay loams that have lower layers of clay and clay loam, respectively. The Olton soils typically are brown to reddish-brown clay loams that have lower layers of reddish-brown clay loam to clay.

Minor soils of this association are of the Mansker, Roscoe, Lipan, and Spur series. Mansker soils, which are on ridges, are gently sloping. Spur soils are along the flood plains of small streams. Roscoe and Lipan soils, which are in depressed areas, are moderately well drained.

About 85 percent of this association is cultivated. The rest is used for range.

2. *Miles-Cobb association*

Deep and moderately deep, nearly level to gently sloping, well-drained, moderately permeable, loamy soils

This association (fig. 3, p. 4) consists of broad areas of nearly level to gently sloping soils. It occupies about 26 percent of the county. The association is about 57 percent Miles and Cobb soils and about 43 percent Spade, Mansker, Latom, Olton, Abilene, Rowena, Veal, Brownfield, Tivoli, Colorado, and Spur soils.

The Miles and Cobb soils are brown to reddish-brown fine sandy loams that have lower layers of friable sandy clay loam. Miles soils developed in old alluvium. Cobb soils developed over red-bed sandstone material.

About 70 percent of this association is cultivated. The rest is used for range.

3. *Mansker-Potter association*

Very shallow to deep, nearly level to steep, well-drained, moderately permeable, loamy soils

This association (fig. 4, p. 5) consists of a large part of the rangeland of the county. It makes up about 16 percent of the county. The association is about 49 percent Mansker soils, about 34 percent Potter soils, and about 17 percent minor soils. Mansker soils are nearly level to gently sloping, and Potter soils are gently sloping to steep.

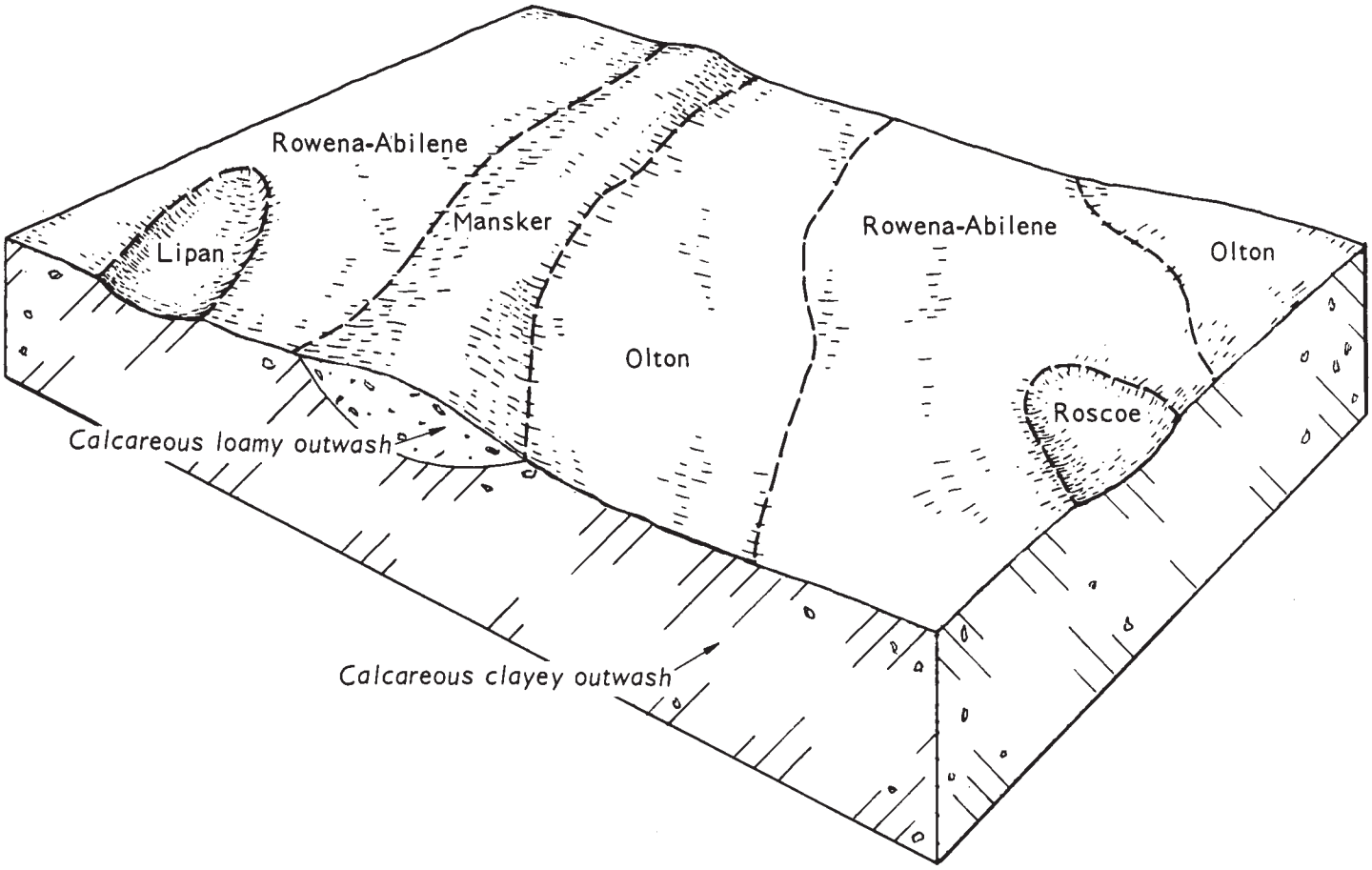

Figure 2.—**Typical pattern of soils in association 1.**

The Mansker soils are deep loams that have lower layers of clay loam. The Potter soils are very shallow to shallow. They developed in thick beds of caliche material.

Minor soils of this association are of the Colorado, Spur, Spade, Veal, Olton, Abilene, Rowena, and Berda series.

About 80 percent of this association is used for range. The rest is cultivated. The Potter soils are unsuited to crops, because they are shallow.

4. Vernon-Stamford association

Deep, nearly level to steep, well-drained, slowly and very slowly permeable, clayey and loamy soils

This association (fig. 5, p. 6) consists of areas of nearly level to steep soils that have a well-defined drainage system. It occupies about 11 percent of the county. The association is about 35 percent Vernon soils, about 14 percent Stamford soils, and about 51 percent minor soils.

The Vernon soils are reddish-brown clay and clay loams that have lower layers of reddish-brown clay. These soils are on narrow ridges, on hilltops, and along the side slopes of natural drainageways. The Stamford soils are reddish-brown clay and have a lower layer of reddish-brown clay. They are nearly level to gently sloping.

Minor soils of this association are of the Weymouth, Olton, Potter, Colorado, Spur, Mangum, and Latom series. Areas of Badland are in this association also.

Most of this association is used for range, but a few areas are cultivated.

5. Quinlan-Broken land association

Shallow, gently sloping to steep, well-drained to excessively drained soils and rough broken and stony land

This association (fig. 6, p. 7) consists of areas of gently sloping to steep soils. It occupies about 7 percent of the county. The association is about 55 percent Quinlan soils, about 20 percent Rough broken and stony land, and about 25 percent minor soils. Ridges and knolls broken by a complex drainage pattern of deep, eroded gullies are characteristics of this association.

The Quinlan soils are mostly on the ridges and knolls. They are yellowish-red loam underlain by soft sandstone material. Rough broken and stony land is confined to the deep gullies and bluffs of Permian sandstone and gypsum material.

Minor soils of this association are of the Carey, Colorado, Hilgrave, Spur, and Woodward series.

This association is used for range. Water erosion is a hazard.

Descriptions of the Soils

This section describes the soil series and mapping units of Scurry County. The approximate acreage and proportionate extent of the soils are given in table 1.

TABLE 1.—*Approximate acreage and proportionate extent of soils*

Soil	Acres	Percent	Soil	Acres	Percent
Berda loam, 1 to 3 percent slopes	1, 158	0. 2	Rough broken and stony land	7, 991	1. 3
Brownfield fine sand	4, 000	. 7	Rowena-Abilene complex, 0 to 1 percent slopes	94, 932	16. 3
Carey loam, 1 to 3 percent slopes	417	(1)	Rowena-Abilene complex, 1 to 3 percent slopes	28, 061	4. 9
Colorado and Spur soils	13, 918	2. 4	Spade-Latom fine sandy loams, 1 to 3 percent slopes	6, 177	1. 0
Drake clay loam, 1 to 3 percent slopes	165	(1)	Spade-Latom fine sandy loams, 3 to 5 percent slopes	8, 021	1. 4
Hilgrave gravelly fine sandy loam	3, 498	. 6	Spur clay loam	14, 395	2. 4
Latom soils	17, 461	3. 1	Spur fine sandy loam	3, 052	. 5
Lea-Kimbrough-Slaughter complex	1, 448	. 2	Stamford clay, 0 to 1 percent slopes	3, 153	. 5
Lipan clay	1, 146	. 2	Stamford clay, 1 to 3 percent slopes	6, 544	1. 1
Mangum and Colorado soils	3, 998	. 8	Tivoli fine sand	2, 983	. 5
Mansker loam, 0 to 1 percent slopes	1, 196	. 2	Veal fine sandy loam, 1 to 3 percent slopes	5, 052	. 9
Mansker loam, 1 to 3 percent slopes	39, 421	6. 8	Veal fine sandy loam, 3 to 5 percent slopes	2, 616	. 4
Mansker loam, 3 to 5 percent slopes	10, 767	1. 9	Vernon clay, 1 to 3 percent slopes	3, 641	. 6
Mansker-Potter complex	6, 810	1. 2	Vernon clay, 3 to 5 percent slopes	2, 992	. 5
Miles fine sandy loam, 0 to 1 percent slopes	5, 034	. 9	Vernon-Badland complex	8, 314	1. 5
Miles and Cobb fine sandy loams, 1 to 3 percent slopes	73, 151	12. 6	Vernon-Potter complex	11, 624	1. 9
Miles and Cobb fine sandy loams, 3 to 5 percent slopes	5, 278	. 9	Weymouth-Vernon clay loams, 1 to 3 percent slopes	14, 523	2. 6
Miles loamy fine sand, 0 to 3 percent slopes	4, 834	. 8	Weymouth-Vernon clay loams, 3 to 5 percent slopes	2, 631	. 4
Olton clay loam, 0 to 1 percent slopes	24, 765	4. 2	Woodward loam, 1 to 3 percent slopes	1, 997	. 3
Olton clay loam, 1 to 3 percent slopes	52, 872	9. 2	Water areas	3, 456	. 6
Olton loam, 0 to 1 percent slopes	4, 991	. 8			
Olton loam, 1 to 3 percent slopes	16, 029	2. 8	Total	581, 760	100. 0
Potter soils	28, 053	4. 8			
Quinlan soils	22, 574	3. 9			
Roscoe clay	6, 621	1. 2			

[1] Less than 0. 1 percent.

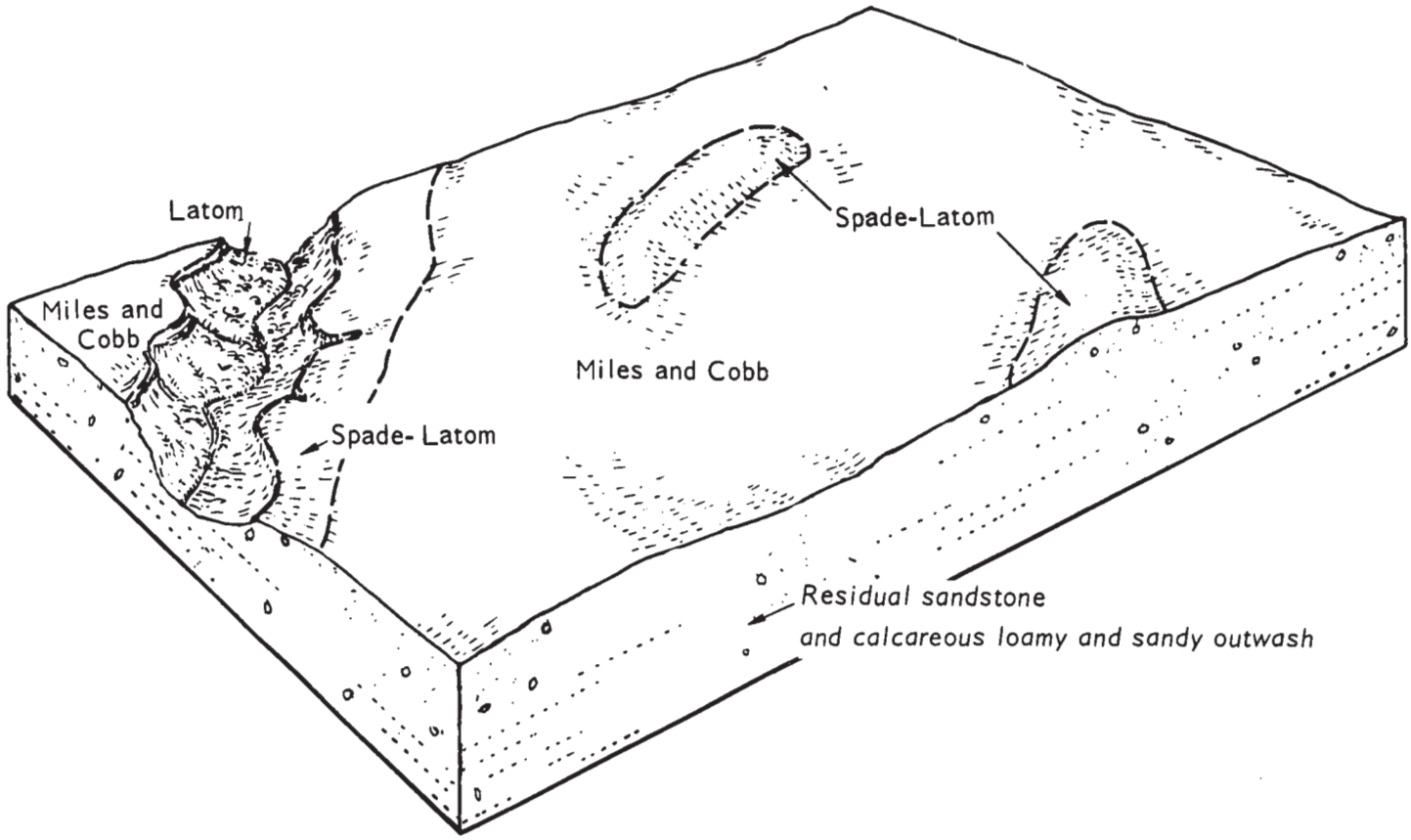

Figure 3.—**Typical pattern of soils in association 2.**

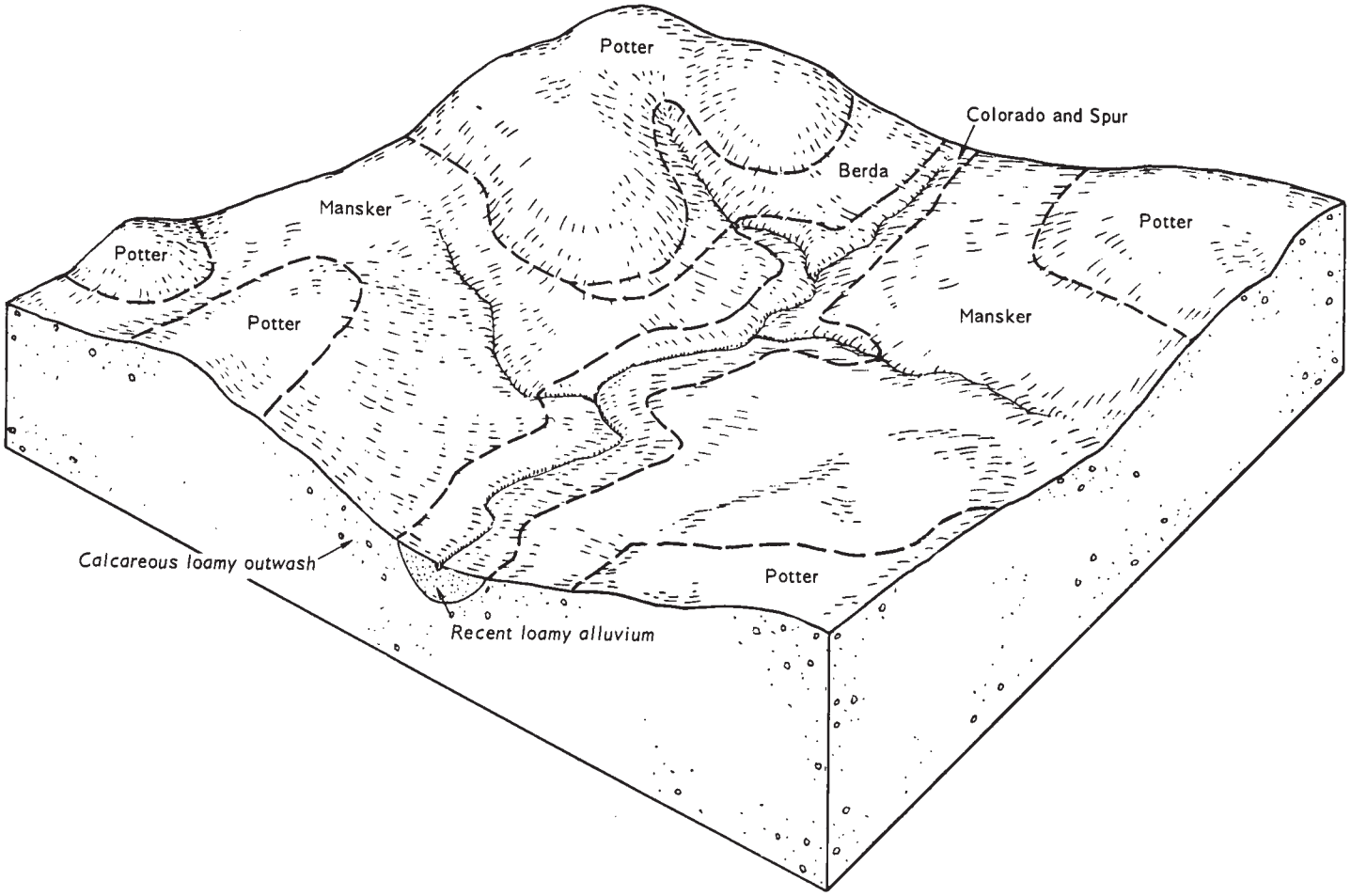

Figure 4.—**Typical pattern of soils in association 3.**

In the pages that follow, a general description of each soil series is given. Each series description has a short narrative description of a typical profile and a much more detailed description of the same profile, from which highly technical interpretations can be made. Soil colors are for a dry soil unless otherwise stated. Following the profile is a brief statement of the range in characteristics of the soils in the series, as mapped in Scurry County.

Following the series description, each mapping unit in the series is described individually. For full information on any one mapping unit, it is necessary to read the description of the soil series as well as the description of the mapping unit.

After the name of each mapping unit there is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. At the end of the description of each mapping unit are listed the capability unit and the range site in which the mapping unit has been placed. The pages where each capability unit or range site is described can be readily learned by referring to the "Guide to Mapping Units."

For more general information about the soils, the reader can refer to the section "General Soil Map," in which the broad patterns of soils are described. Many of the terms used in the soil descriptions and other parts of the survey are defined in the Glossary.

Abilene Series

The Abilene series consists of deep, nearly level to gently sloping, moderately slowly permeable, friable soils on broad uplands. These soils have clay lower layers. In this county Abilene soils are mapped only in a complex with Rowena soils.

In a representative profile the surface layer is dark grayish-brown clay loam about 7 inches thick. Below this layer is about 8 inches of dark grayish-brown silty clay loam. The next layer is dark grayish-brown and grayish-brown clay about 31 inches thick. The underlying material, to a depth of 56 inches, is pink silty clay loam and, to a depth of 64 inches, is reddish-yellow silty clay loam.

Abilene soils are well drained. The available water capacity is high.

A representative profile of Abilene clay loam, from an area of Rowena-Abilene complex, 0 to 1 percent slopes, in a cultivated field 84 feet west and 0.8 mile south of a county road, from a point 1.5 miles south of Hermleigh, on U.S. Highway 84, and thence 0.8 mile east:

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak subangular blocky structure; hard, friable, slightly sticky; many fine pores; noncalcareous; mildly alkaline; abrupt, smooth boundary.

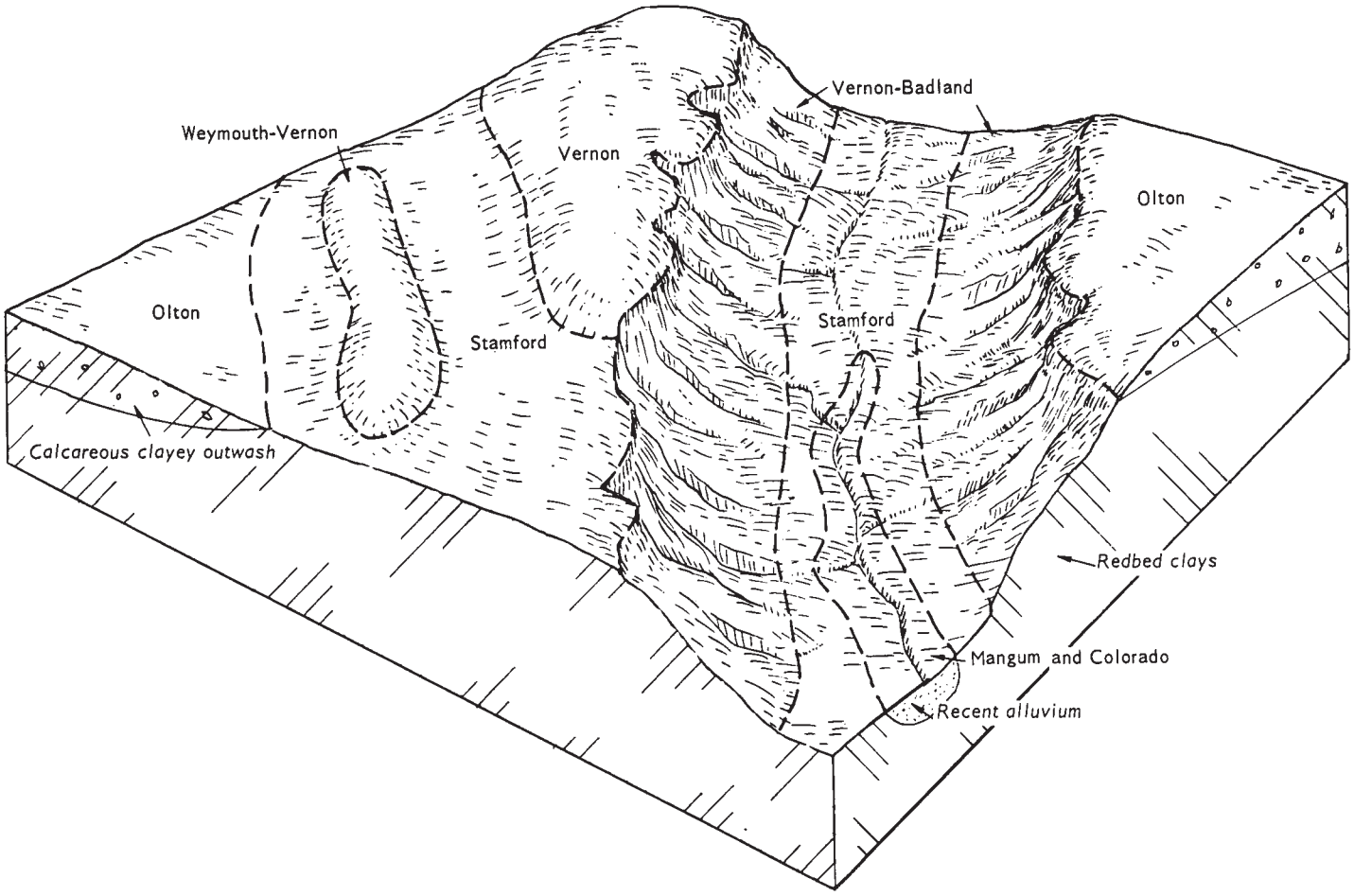

Figure 5.—**Typical pattern of soils in association 4.**

B1—7 to 15 inches, dark grayish-brown (10YR 4/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate, medium, subangular blocky structure; very hard, firm, sticky; common fine pores; noncalcareous; mildly alkaline; clear, smooth boundary.

B21t—15 to 35 inches, dark grayish-brown (10YR 4/2) clay, dark brown (10YR 3/3) moist; moderate, medium, subangular blocky structure and weak, fine to medium, blocky; very hard, firm, sticky; few very fine pores; thin, nearly continuous clay films; calcareous; moderately alkaline; gradual, smooth boundary.

B22t—35 to 46 inches, grayish-brown (10YR 5/2) clay, brown (10YR 4/3) moist; moderate, medium, subangular blocky structure and weak, fine to medium, blocky; very hard, firm, sticky; thin, nearly continuous clay films; few, fine, hard calcium carbonate concretions; calcareous; moderately alkaline; diffuse, wavy boundary.

C1ca—46 to 56 inches, pink (7.5YR 8/4) silty clay loam, pink (7.5YR 7/4) moist; massive; hard, friable; many soft lumps of calcium carbonate that make up about 30 to 50 percent, by volume, of the horizon; calcareous; moderately alkaline; diffuse, wavy boundary.

C2—56 to 64 inches +, reddish-yellow (5YR 6/6) silty clay loam, yellowish red (5YR 5/6) moist; massive; hard, friable; common soft lumps of calcium carbonate that make up about 4 to 8 percent, by volume, of the horizon; calcareous; moderately alkaline.

The A horizon ranges from clay loam to silty clay loam in texture and from 6 to 10 inches in thickness. The color ranges from brown to very dark grayish brown. This horizon is noncalcareous, and reaction ranges from neutral to moderately alkaline.

The B1 horizon ranges from brown to very dark grayish brown in color and from 6 to 11 inches in thickness. The texture ranges from clay loam to silty clay loam.

The B2t horizons range from clay loam to clay in texture and from 18 to 37 inches in thickness. The color ranges from brown to dark grayish brown. The structure ranges from moderate, medium, subangular blocky to moderate, medium, blocky. Reaction ranges from mildly alkaline to moderately alkaline.

The depth to the C1ca horizon ranges from 30 to 58 inches. The color of this horizon ranges from pink to reddish yellow. Soft lumps and hard concretions of calcium carbonate make up an estimated 10 to 55 percent, by volume, of this horizon.

The depth to the C2 horizon ranges from 50 to 68 inches. The color of this horizon ranges from yellowish red to reddish yellow. Soft lumps of calcium carbonate make up an estimated 2 to 10 percent, by volume, of this horizon.

Berda Series

The Berda series consists of deep, gently sloping, well-drained, friable soils on uplands. These soils developed in loamy, calcareous, local colluvial materials.

In a representative profile the surface layer is brown loam about 9 inches thick. The next layer is brown clay loam in the upper 11 inches and light-brown clay loam in the lower 30 inches. The underlying material, to a depth of 62 inches, is pink, calcareous loam.

Representative profile of Berda loam, 1 to 3 percent slopes, in a pasture 0.7 mile west from a point 2.45 miles north on U.S. Highway 84, from the junction of U.S. Highway 84 and Farm Road 612:

A1—0 to 9 inches, brown (7.5YR 5/3) loam, dark brown (7.5YR 4/3) moist; weak subangular blocky structure; slightly hard, friable; many fine roots; few fine pores; few fine pebbles; calcareous; moderately alkaline; clear, smooth boundary.

B2—9 to 20 inches, brown (7.5YR 5/4) clay loam, dark brown (7.5YR 4/4) moist; weak, coarse, prismatic structure parting to weak subangular blocky; hard, friable; common fine pores; few to common films and few fine concretions of calcium carbonate; few fine pebbles; calcareous; moderately alkaline; gradual, smooth boundary.

B3ca—20 to 50 inches, light-brown (7.5YR 6/4) clay loam, brown (7.5YR 5/4) moist; weak, coarse, prismatic structure parting to weak subangular blocky; hard, friable; few, hard, fine concretions and soft lumps of calcium carbonate; few fine to medium pebbles; calcareous; moderately alkaline; diffuse, wavy boundary.

C—50 to 62 inches +, pink (7.5YR 7/4) loam, light brown (7.5YR 6/4) moist; massive; hard, friable; few, hard, fine concretions and films and threads of calcium carbonate in lesser amounts than in the B3ca horizon; calcareous; moderately alkaline.

The A horizon ranges from 6 to 12 inches in thickness. The color ranges from light brown to grayish brown.

The B2 horizon ranges from 9 to 14 inches in thickness and from loam to clay loam in texture. The color ranges from light brown to brown.

The depth to the B3ca horizon ranges from 17 to 26 inches. The color of this horizon ranges from light brown to pink.

The depth to the C horizon ranges from 46 to 58 inches. The color ranges from light brown to pink.

Berda loam, 1 to 3 percent slopes (BeB).—This soil is on convex slopes below areas of Potter soils and Rough broken and stony land. The areas are irregular in shape and range from 30 to 160 acres in size. The slope is mostly between 2 and 3 percent.

Included in mapping were areas of Mansker soils and a few small eroded areas in which the gullies are 1 to 3 feet deep and 2 to 5 feet wide. Also included were a few areas where the slope is more than 3 percent.

This soil is used for range. The available water capacity is high. Water erosion is a moderate hazard. Soil blowing is a slight hazard. Runoff is medium, and per-

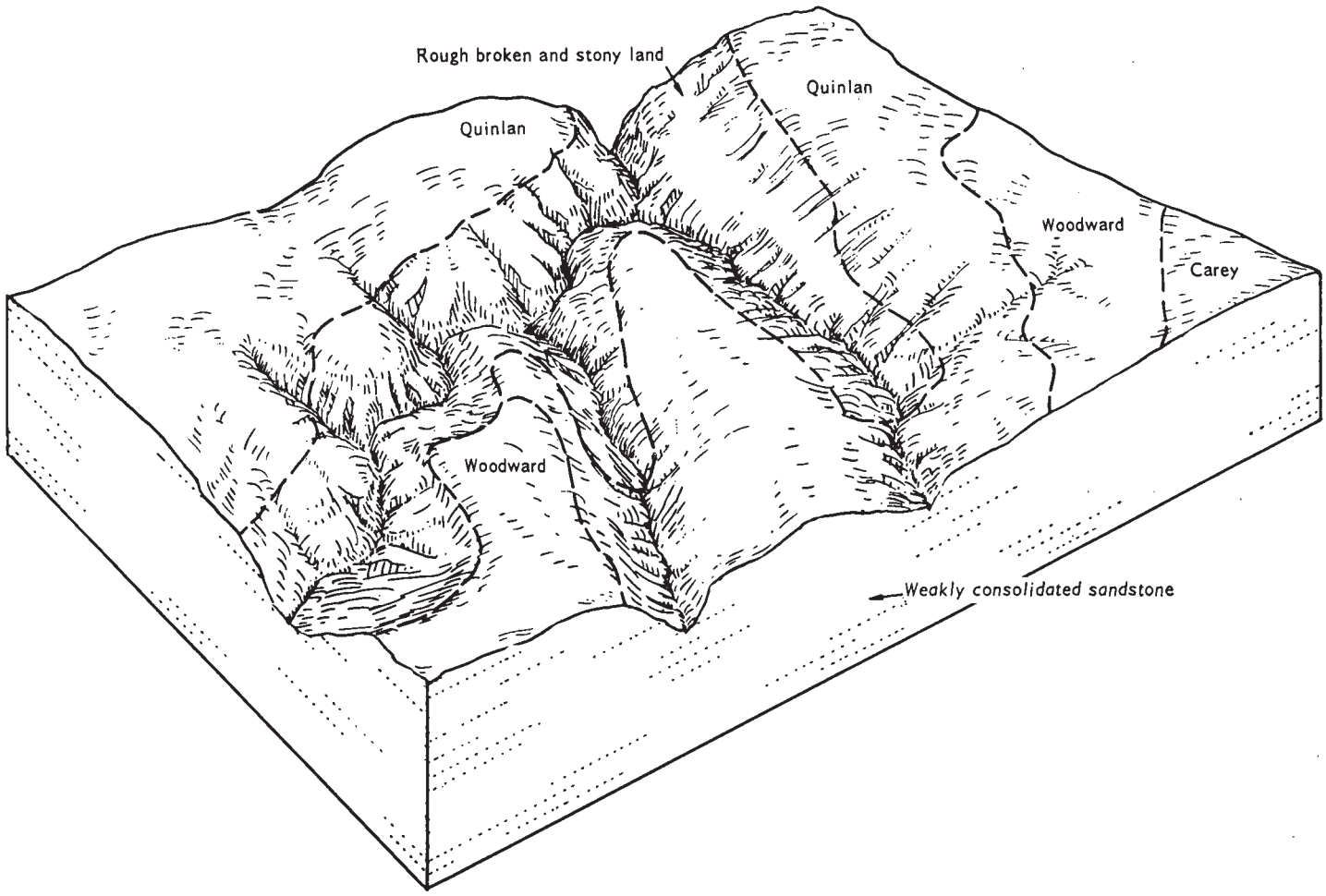

Figure 6.—**Typical pattern of soils in association 5.**

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meability is moderate. (Capability unit IIIe–7, dryland; Deep Hardland range site)

Brownfield Series

The Brownfield series consists of deep, nearly level to undulating, loose, moderately permeable, sandy soils. These soils are on broad uplands. They developed in moderately sandy to sandy sediments.

In a representative profile the surface layer is brown fine sand about 9 inches thick. Below this layer is 17 inches of light-brown fine sand. The next layer is yellowish-red sandy clay loam about 22 inches thick. The underlying material, to a depth of 60 inches, is reddish-yellow fine sandy loam.

Representative profile of Brownfield fine sand, in a pasture 0.1 mile west of Texas Highway 350, from a point 2.75 miles south of Ira:

A1—0 to 9 inches, brown (7.5YR 5/4) fine sand, dark brown (7.5YR 4/4) moist; single grain; loose; neutral; gradual, smooth boundary.

A2—9 to 26 inches, light-brown (7.5YR 6/4) fine sand, brown (7.5YR 5/4) moist; single grain; loose; few fine and medium roots; slightly acid; gradual, smooth boundary.

B21t—26 to 36 inches, yellowish-red (5YR 5/6) sandy clay loam, yellowish red (5YR 4/6) moist; moderate, very coarse, prismatic structure parting to weak subangular blocky; hard, friable; continuous clay films on vertical faces of prisms; slightly acid; gradual, smooth boundary.

B22t—36 to 48 inches, yellowish-red (5YR 5/6) sandy clay loam, yellowish red (5YR 4/6) moist; moderate, very coarse, prismatic structure parting to weak subangular blocky; hard, friable; patchy clay films on vertical faces of prisms; neutral; gradual, smooth boundary.

C—48 to 60 inches +, reddish-yellow (5YR 6/8) fine sandy loam, yellowish red (5YR 5/8) moist; single grain; slightly hard, friable; neutral.

The A horizon ranges from 20 to 32 inches in thickness. The color ranges from reddish yellow to light brown.

The B2t horizons range from 13 to 48 inches in thickness and from red to yellowish red in color. The structure is moderately coarse to very coarse prismatic and weak subangular blocky. Reaction ranges from slightly acid to mildly alkaline.

The depth to the C horizon ranges from 45 to 60 inches. The texture of this horizon ranges from fine sandy loam to loamy fine sand. The color ranges from light red to yellowish red.

Brownfield fine sand (Br).—This is a nearly level to gently undulating soil on uplands. The areas are irregular in shape and range from 100 to 800 acres in size. The slope is between 0.5 and 3.0 percent.

Included in mapping were small mounds of Tivoli fine sand, small areas of Miles loamy fine sand, and a few areas that are severely eroded.

This soil is used mostly for range. A few small areas have been cultivated and are now abandoned. Soil blowing is a severe hazard. This soil is well drained, and runoff is very slow. The available water capacity is low. (Capability unit VIe–7, dryland; Deep Sand range site)

Carey Series

The Carey series consists of deep, gently sloping, moderately permeable, friable soils on uplands. These soils developed in soft, calcareous sandstone red beds of Permian age.

In a representative profile the surface layer is reddish-brown loam about 10 inches thick. The next layer is reddish-brown silty clay loam in the upper 14 inches and yellowish-red silty clay loam in the lower 11 inches. The underlying material, to a depth of 48 inches, is reddish-yellow clay loam. Below this, to a depth of 56 inches, is yellowish-red soft sandstone.

Representative profile of Carey loam, 1 to 3 percent slopes, in a cultivated field 50 feet south of a county road, from a point 8.5 miles east of Snyder, on Farm Road 1614, 6.0 miles north, 4.0 miles east, 2.6 miles north, 1.0 mile east, 0.5 mile north, 1.5 miles east, 1.0 mile south, and 1.25 miles east:

Ap—0 to 10 inches, reddish-brown (5YR 5/4) loam, dark reddish brown (5YR 3/4) moist; weak granular structure; hard, friable; many very fine pores; mildly alkaline; abrupt, smooth boundary.

B2t—10 to 24 inches, reddish-brown (5YR 4/4) silty clay loam, dark reddish brown (5YR 3.5/4) moist; weak, medium to coarse, prismatic structure parting to weak, fine to medium, subangular blocky; hard, friable; few patchy clay films; many very fine and common fine pores; mildly alkaline; gradual, wavy boundary.

B3—24 to 35 inches, yellowish-red (5YR 5/6) silty clay loam, yellowish red (5YR 4/6) moist; weak, fine to medium, subangular blocky structure; hard, friable; few threads and films of calcium carbonate; many very fine pores; calcareous; mildly alkaline; clear, wavy boundary.

C1ca—35 to 48 inches, reddish-yellow (5YR 6/6) clay loam, yellowish red (5YR 5/6) moist; massive; hard, friable; few hard concretions and soft lumps of calcium carbonate; calcareous; moderately alkaline; gradual, wavy boundary.

C2—48 to 56 inches +, yellowish-red (5YR 5/6), calcareous, soft Permian sandstone.

The A horizon ranges from 7 to 12 inches in thickness. The color ranges from light reddish brown to brown.

The B2t horizon ranges from 10 to 16 inches in thickness and from red to reddish brown in color. The texture ranges from loam to silty clay loam. The structure ranges from coarse prismatic to weak or moderate, fine to medium, subangular blocky.

The B3 horizon ranges from 11 to 18 inches in thickness and from red to reddish yellow in color. The texture ranges from loam to silty clay loam.

The depth to the C1ca horizon ranges from 29 to 46 inches. The thickness of this horizon ranges from 9 to 26 inches. Soft lumps and hard concretions of calcium carbonate make up an estimated 5 to 30 percent, by volume, of this horizon.

The depth to the C2 horizon ranges from 38 to 62 inches.

Carey loam, 1 to 3 percent slopes (CaB).—This soil is on convex slopes. The areas are oblong in shape and range from 40 to 100 acres in size. The slope is mostly between 1.5 and 2.5 percent.

Areas of Woodward loam and Olton clay loam were included in mapping.

About 50 percent of the acreage is cultivated. The rest is used for range. Soil blowing is a slight hazard, and water erosion is a moderate hazard. This soil is well drained, and runoff is medium. The available water capacity is high. (Capability unit IIe–1, dryland; Mixedland range site)

Cobb Series

The Cobb series consists of moderately deep, gently sloping, moderately permeable, friable soils overlying

sandstone. These soils are on uplands. In this county they are mapped only with Miles soils.

In a representative profile the surface layer is brown fine sandy loam about 10 inches thick. The next layer is reddish-brown sandy clay loam in the upper 16 inches and yellowish-red sandy clay loam in the lower 12 inches. Below this, to a depth of 44 inches, is weakly cemented, yellowish-brown sandstone.

These soils are well drained, and runoff is medium. The available water capacity is high.

Representative profile of Cobb fine sandy loam, in an area of Miles and Cobb fine sandy loams, 1 to 3 percent slopes, in a cultivated field 80 feet north of a county road, from a point 1.5 miles south of Dunn, on Texas Highway 208, and 0.3 mile east on county road:

Ap—0 to 10 inches, brown (7.5YR 5/3) fine sandy loam, dark brown (7.5YR 3/3) moist; weak granular structure; hard, very friable; neutral; abrupt, smooth boundary.

B2t—10 to 26 inches, reddish-brown (5YR 5/4) sandy clay loam, reddish brown (5YR 4/4) moist; moderate, very coarse, prismatic structure parting to weak, fine, subangular blocky; very hard, friable; common fine and medium pores; thin, discontinuous clay films, mostly on vertical faces of prisms; neutral; clear, smooth boundary.

B3—26 to 38 inches, yellowish-red (5YR 5/6) sandy clay loam, yellowish red (5YR 4/6) moist; weak subangular blocky structure; hard, friable; abrupt, wavy boundary.

R—38 to 44 inches +, weakly cemented, noncalcareous, yellowish-brown sandstone.

The A horizon ranges from 7 to 12 inches in thickness. The color ranges from reddish brown to brown.

The B2t horizon ranges from red to reddish brown in color. The structure ranges from weak to moderate, coarse, prismatic to weak, fine to medium, subangular blocky.

The B3 horizon is dominantly red or yellowish red in color.

The depth to the R layer ranges from 26 to 48 inches.

Colorado Series

The Colorado series consists of deep, nearly level, moderately permeable, calcareous soils. These soils are on flood plains of most of the major streams, creeks, and intermittent drainageways throughout the county. In this county Colorado soils are mapped only with Spur and Mangum soils.

In a representative profile the surface layer is reddish-brown clay loam about 7 inches thick. The underlying material, to a depth of 24 inches, is reddish-brown silty clay loam stratified with very fine sandy loam. Below this, to a depth of 48 inches, is yellowish-red clay loam stratified with silt loam and very fine sandy loam.

This soil is well drained. The available water capacity is high.

Representative profile of Colorado clay loam, in an area of Mangum and Colorado soils, in a pasture 0.5 mile north of Farm Road 1610, from a point 1.25 miles west of the Knapp Baptist Church:

A1—0 to 7 inches, reddish-brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) moist; weak, coarse, prismatic structure parting to weak subangular blocky; hard, friable; few bedding planes; few films and threads of calcium carbonate; few fine pores; few roots; calcareous; moderately alkaline; clear, smooth boundary.

C1—7 to 24 inches, reddish-brown (5YR 5/4) silty clay loam; reddish brown (5YR 4/4) moist; massive; hard, friable; few bedding planes; few films and threads of calcium carbonate; few fine pores; few roots; this horizon is stratified with thin layers of very fine sandy loam; calcareous; moderately alkaline; abrupt, smooth boundary.

C2—24 to 48 inches +, yellowish-red (5YR 5/6) clay loam, yellowish red (5YR 4/6) moist; massive; hard, friable; few films and threads of calcium carbonate; few fine pores; bedding planes are visible; this horizon is stratified with thin layers of silt loam and very fine sandy loam; calcareous; moderately alkaline.

The A1 horizon ranges from 4 to 14 inches in thickness. The color ranges from brown to reddish brown. The texture is dominantly clay loam, but in a few areas it ranges from loam to very fine sandy loam.

The C1 horizon ranges from sandy clay loam to silty clay loam in texture and from light reddish brown to reddish brown in color. The thickness ranges from 4 to 19 inches.

The C2 horizon ranges from yellowish red to reddish brown in color and from very fine sandy loam to clay loam in texture. The average clay content, to a depth of 40 inches, ranges from 18 to 35 percent.

Colorado and Spur soils (Co).—This undifferentiated group (fig. 7) occupies flood plains of most major streams, small creeks, and intermittent drainageways in the county. Frequent flooding is a hazard during periods of normal or high rainfall. The flood plains are dissected by old creekbeds and by channels that meander back and forth within the flood plains. They range from 100 to 400 yards in width and are somewhat continuous in length. The areas are 40 to 400 acres in size.

Any given area of this undifferentiated group may consist of both Colorado and Spur soils or of only one of these soils. Approximately 58 percent of the acreage is Colorado soils, and 34 percent is Spur soils. The remaining 8 percent consists of inclusions of Mangum clay and a few areas that have a pale-brown to yellowish-red very fine sandy loam or fine sandy loam surface layer and very fine sandy loam to fine sand lower layers.

The Colorado component has a reddish-brown clay loam surface layer about 8 inches thick. The underlying material, to a depth of about 24 inches, is reddish-brown clay loam. Below this is yellowish-red clay loam stratified with sandy loam.

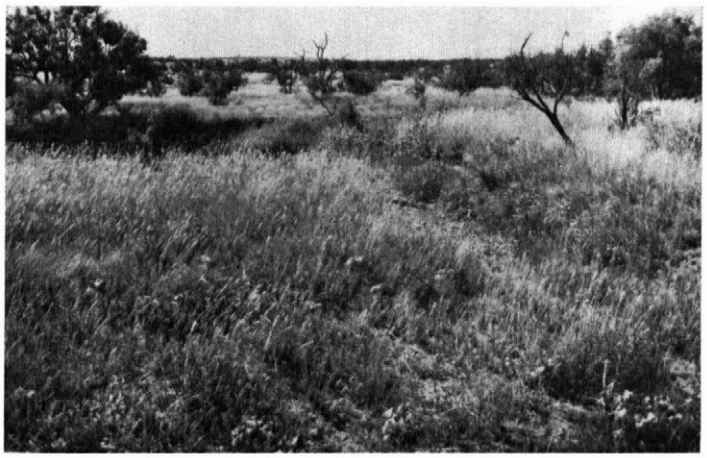

Figure 7.—An area of Colorado and Spur soils.

The Spur component has a surface layer of brown clay loam about 12 inches thick. The next layer is brown clay loam about 13 inches thick. The underlying material is brown clay loam stratified with sandy loam.

Cultivation is risky unless protection from flooding is provided. These soils are used mostly for grazing. (Capability unit Vw–1, dryland; Loamy Bottomland range site)

Drake Series

The Drake series consists of deep, gently sloping, moderately permeable, limy soils. These soils are in areas adjacent to and above lower lying Lipan and Roscoe soils.

In a representative profile the surface layer, about 7 inches thick, is gray clay loam. The next layer is light-gray clay loam about 19 inches thick. The underlying material, to a depth of 60 inches, is white limy clay loam.

Representative profile of Drake clay loam, 1 to 3 percent slopes, in a cultivated field 50 feet north of a county road, from a point 1.3 miles west of Inadale:

Ap—0 to 7 inches, gray (10YR 6/1) clay loam, dark gray (10YR 4/1) moist; weak subangular blocky and granular structure; hard, friable, slightly sticky; common very fine pores; calcareous; moderately alkaline; abrupt, smooth boundary.

B—7 to 26 inches, light-gray (10YR 7/1) clay loam, gray (10YR 6/1) moist; weak subangular blocky structure; hard, friable, slightly sticky; few, small, soft masses and threads of calcium carbonate; calcareous; moderately alkaline; clear, smooth boundary.

C—26 to 60 inches +, white (10YR 8/1) clay loam, light gray (10YR 7/1) moist; weak subangular blocky and granular structure; hard, friable; calcareous; moderately alkaline.

The A horizon ranges from 6 to 10 inches in thickness. The color ranges from light gray to grayish brown.

The B horizon ranges from 7 to 20 inches in thickness. The color ranges from light gray to light brownish gray.

The depth to the C horizon ranges from 13 to 30 inches. The color of this horizon ranges from white to light gray.

Drake clay loam, 1 to 3 percent slopes (DcB).—This soil is on uplands on the eastern and southwestern sides of playa lakes. The areas are long, crescent shaped, and 60 to 105 acres in size. The slope ranges from 1 to 3 percent but averages about 2 percent.

Included in mapping were a few small areas where the surface layer is loam and a few small areas of Mansker loam.

Most of this soil is cultivated. A few small areas are used for range. Soil blowing and water erosion are moderate hazards. The available water capacity is high. This soil is well drained, and runoff is medium. (Capability unit IVes–1, dryland; Deep Hardland range site)

Hilgrave Series

The Hilgrave series consists of gravelly, moderately deep, gently sloping to steep, moderately rapidly permeable soils on uplands. These soils occupy narrow ridges and knolls above Triassic and Permian sediments.

In a representative profile the surface layer is brown gravelly fine sandy loam about 7 inches thick. The next layer is reddish-brown gravelly sandy clay loam in the upper 15 inches and light reddish-brown gravelly sandy clay loam in the lower 12 inches. The underlying material, to a depth of 38 inches, is sandy red-bed material.

Representative profile of Hilgrave gravelly fine sandy loam, in a pasture 20 feet east of a county road, from a point 8.5 miles east of Snyder, on Farm Road 1614, 6.0 miles north and 3.4 miles east on a county road:

A1—0 to 7 inches, brown (7.5YR 5/4) gravelly fine sandy loam, dark brown (7.5YR 4/4) moist; weak granular structure; hard, friable; 40 percent, by volume, of this horizon consists of waterworn gravel; common roots; common fine pores; mildly alkaline; gradual, smooth boundary.

B2t—7 to 22 inches, reddish-brown (5YR 5/4) gravelly sandy clay loam, reddish brown (5YR 4/4) moist; weak granular structure; hard, friable; 60 percent, by volume, of this horizon consists of waterworn gravel; some of the gravel is coated with lime in the lower part; mildly alkaline; clear, smooth boundary.

B3ca—22 to 34 inches, light reddish-brown (5YR 6/4) gravelly sandy clay loam, reddish brown (5YR 5/4) moist; weak granular structure; hard, friable; 50 percent, by volume, of this horizon consists of waterworn gravel; the gravel is coated with lime; few, hard, fine concretions and few films and threads of calcium carbonate; calcareous; moderately alkaline; clear, wavy boundary.

IIC—34 to 38 inches +, Permian sandy red-bed material.

The A horizon ranges from 5 to 9 inches in thickness and from dark brown to reddish brown in color. The gravel content ranges from 30 to 40 percent, by volume.

The B2t horizon ranges from 9 to 16 inches in thickness and from brown to reddish brown in color. The texture ranges from gravelly sandy clay loam to gravelly fine sandy loam. The gravel content ranges from 40 to 60 percent, by volume.

The B3ca horizon ranges from 12 to 16 inches in thickness. The color ranges from light reddish brown to reddish brown.

Hilgrave gravelly fine sandy loam (Hg).—This soil is on high, narrow ridges and knolls. The slope ranges from 3 to 30 percent. The ridges range from 200 to 1,200 feet in width. Some of the ridges are dissected by small valleys. The valleys are 30 to 150 feet wide and are 20 to 50 feet lower than the ridges.

The principal inclusions are soils that have more than 60 percent gravel. Also included in mapping were small areas of Miles fine sandy loam, Olton soils, Woodward loam, and Quinlan soils.

This soil is used for range. The vegetation consists of short and mid grasses. The available water capacity is moderate. The soil is well drained, and runoff is medium to rapid. (Capability unit VIs–1, dryland; Gravelly range site)

Kimbrough Series

The Kimbrough series consists of gently sloping, moderately permeable soils that are very shallow over thick beds of indurated caliche. These soils are on uplands. In this county they are mapped only in a complex with Lea and Slaughter soils.

In a representative profile the surface layer is dark grayish-brown clay loam about 7 inches thick. The underlying material, to a depth of about 10 inches, is white indurated caliche.

Kimbrough soils are well drained, and runoff is medium. The available water capacity is low.

Representative profile of Kimbrough clay loam, in an area of Lea-Kimbrough-Slaughter complex, in a pasture

2.3 miles north on a ranch road, from a point 2.5 miles east of Fluvanna, on Farm Road 612, and 1.0 mile north of rural road:

A1—0 to 7 inches, dark grayish-brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak, fine, granular structure and weak subangular blocky; hard, friable; few fragments of cemented caliche; common fine roots; calcareous; moderately alkaline; abrupt, wavy boundary.

Ccam—7 to 10 inches +, white indurated caliche; calcareous.

The A horizon ranges from 7 to 9 inches in thickness and from dark grayish brown to grayish brown in color. The texture ranges from loam to clay loam.

The depth to the Ccam horizon ranges from 7 to 9 inches. The indurated caliche layer is generally 1 to 3 feet thick over softer, more massive caliche that is many feet thick.

Latom Series

The Latom series consists of shallow to very shallow, calcareous soils that developed in material weathered from sandstone. These soils are gently sloping to steep, and their slopes are convex.

In a representative profile the surface layer is brown fine sandy loam about 6 inches thick. Below this is light yellowish-brown, cemented, calcareous sandstone.

These soils are well drained, and surface runoff is medium to rapid. The available water capacity is low.

Representative profile of Latom fine sandy loam, in a pasture 60 feet south of Farm Road 1606, from a point 5.2 miles west of Ira:

A1—0 to 6 inches, brown (10YR 5/3) fine sandy loam, dark brown (10YR 4/3) moist; weak granular structure; slightly hard, friable; common small sandstone fragments; calcareous; moderately alkaline; abrupt, wavy boundary.

R—6 inches +, light yellowish-brown (2.5Y 6/4), cemented, calcareous sandstone, light olive brown (2.5Y 5/4) moist.

The A horizon ranges from reddish brown to light yellowish brown in color and from 4 to 18 inches in thickness. The texture is fine sandy loam, stony loam, or sandy clay loam.

The R layer ranges from reddish brown to olive yellow in color.

Latom soils (La).—This mapping unit occupies upland ridges and knolls and natural drainageways. The soils are gently sloping to steep. The areas are elongated to irregular in shape and range from 30 to several hundred acres in size. The slope ranges from 3 to 40 percent but averages about 10 percent. The surface layer is fine sandy loam, stony loam, or sandy loam.

Included in mapping were areas of Spade fine sandy loam, Miles and Cobb fine sandy loams, Colorado and Spur soils, and Vernon clay, and areas of sandstone rock outcrops. These rock outcrops consist of large boulders that come up to and protrude above the surface.

These soils are not arable, but they are mostly suitable for use as range. About 20 percent of the acreage is inaccessible to cattle. (Capability unit VIIs–1, dryland; Very Shallow range site)

Lea Series

The Lea series consists of shallow to moderately deep, gently sloping, moderately permeable, friable soils on uplands. Indurated caliche is at a depth of less than 36 inches. In this county Lea soils are mapped only in a complex with Kimbrough and Slaughter soils.

In a representative profile the surface layer is dark-brown clay loam about 5 inches thick. The next layer is brown clay loam 14 inches thick. The underlying material is pinkish-white loam to a depth of 22 inches. Below this, to a depth of 25 inches, is white, indurated caliche.

Lea soils are well drained, and runoff is medium. The available water capacity is low. The hazard of water erosion is moderate.

Representative profile of Lea clay loam, in an area of Lea-Kimbrough-Slaughter complex, in a pasture 2.4 miles north on ranch road, from a point 2.5 miles east of Fluvanna, on Farm Road 612, and 1.0 mile north on rural road:

A1—0 to 5 inches, dark-brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; weak, granular and subangular blocky structure; hard, friable; common fine roots; calcareous; moderately alkaline; clear, smooth boundary.

B2—5 to 19 inches, brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist and 1 value lighter as depth increases; moderate, coarse, prismatic structure parting to weak, fine to medium, subangular blocky; hard, friable; common fine pores; few fine roots; calcareous; moderately alkaline; clear, wavy boundary.

C1ca—19 to 22 inches, pinkish-white (7.5YR 8/2) loam, pink (7.5YR 8/4) moist; massive; slightly hard, friable; many soft lumps and masses of calcium carbonate; calcareous; moderately alkaline; abrupt, wavy boundary.

C2cam—22 to 25 inches +, white, indurated caliche.

The A horizon ranges from 4 to 7 inches in thickness and from dark brown to grayish brown in color. The texture ranges from loam to clay loam.

The B2 horizon ranges from brown to dark grayish brown in color and from 6 to 14 inches in thickness. The texture ranges from loam to clay loam.

The B3ca horizon, where present, ranges from brown to grayish brown in color and from 0 to 10 inches in thickness.

The depth to the C1ca horizon ranges from 13 to 29 inches. The thickness of this horizon ranges from 3 to 11 inches. The color ranges from white to light brownish gray.

The depth to the C2cam horizon ranges from 16 to 36 inches.

Lea–Kimbrough-Slaughter complex (Lk).—This complex consists of gently sloping soils on uplands. It is made up of about 39 percent Lea soils, 34 percent Kimbrough soils, and 27 percent Slaughter soils. The Kimbrough soils are on the more prominent knolls and ridgetops, surrounded by areas of Lea and Slaughter soils. The areas are irregular in shape and range from 20 to 500 acres in size. The slope ranges from 1.5 to 3 percent.

These soils have the profile described as representative of their respective series.

Small areas of Olton clay loam, Weymouth clay loam, and Colorado and Spur soils were included in mapping this complex.

This complex is used for range. The hazard of water erosion is moderate. (Capability unit IVe–9, dryland; Deep Hardland range site)

Lipan Series

The Lipan series consists of deep, nearly level, very slowly permeable, compacted soils in playas. These soils

formed in calcareous clays, mainly old alluvium or outwash of the Quaternary period.

In a representative profile the surface layer is gray clay about 8 inches thick. The next layer is gray clay 38 inches thick. It has cracks that are at least 1 centimeter wide and that extend to a depth of 20 inches or more. The underlying material, to a depth of 62 inches, is gray clay that contains soft lumps of calcium carbonate.

Lipan soils are moderately well drained, and surface runoff is very slow. The available water capacity is high. Soil blowing and water erosion are slight hazards.

Representative profile of Lipan clay, in a pasture 50 feet west of Farm Road 1269, from a point 1.6 miles south of Fluvanna:

A1—0 to 8 inches, gray (10YR 5/1) clay, dark gray (10YR 4/1) moist; weak blocky structure to massive; extremely hard, firm, plastic; common fine root hairs; calcareous; mildly alkaline; clear, smooth boundary.

AC—8 to 46 inches, gray (10YR 6/1) clay, gray (10YR 5/1) moist; massive; extremely hard, firm, sticky and plastic; peds have shiny pressure faces, few slickensides; few fine concretions of calcium carbonate; calcareous; moderately alkaline; gradual, wavy boundary.

Cca—46 to 62 inches +, gray (10YR 6/1) clay, gray (10YR 5/1) moist; massive; extremely hard, firm, sticky and plastic; common, soft, white lumps and few fine concretions of calcium carbonate that make up about 8 percent, by volume, of the horizon; calcareous; moderately alkaline.

The A horizon ranges from 6 to 20 inches in thickness and from gray to dark gray in color. Reaction ranges from neutral to moderately alkaline.

The AC horizon ranges from gray to dark gray in color. Reaction is mildly alkaline to moderately alkaline. The structure is weak, coarse, blocky or the soil material is massive.

The depth to the Cca horizon ranges from 38 to 60 inches. The color ranges from gray to light brownish gray. The content of calcium carbonate ranges from 2 to 10 percent.

Lipan clay (Lp).—This soil is nearly level. It is on bottoms of deep depressions or playas. The relief between the surrounding plains and playa bottoms ranges from 4 to 20 feet. The areas range from 20 to 80 acres in size and are circular or oval in shape.

Included in mapping were small areas of Roscoe clay.

About 35 to 40 percent of this soil is cultivated, but about three-fourths of the time a crop is not grown, because the soil is too wet or too dry. When the soil is dry, cracks that are 1 to 2 inches wide and as much as 26 inches deep are common. After rainfall, runoff from surrounding areas covers the soil to a depth of a few inches to several feet for periods of a few days to several weeks.

Areas of this soil that have remained in rangeland have a gilgai microrelief that consists of enclosed microbasins and microknolls. The areas of gilgai are 6 to 16 inches deep, 2 to 5 feet wide, and 5 to 20 feet apart. After a few years of cultivation, the microbasins are filled in and become less visible. (Capability unit IVw–1, dryland; Deep Hardland range site)

Mangum Series

The Mangum series consists of deep, nearly level, very slowly permeable, calcareous, clayey soils. These soils formed in alluvium on flood plains. They have cracks at least 1 centimeter wide. In most years the cracks extend to a depth of 20 inches at times.

In a representative profile the surface layer is reddish-brown clay about 7 inches thick. Below this layer is about 17 inches of reddish-brown clay. The next layer, to a depth of 48 inches, is red clay that contains a few hard calcium carbonate concretions.

Mangum soils are well drained to moderately well drained. Surface runoff is slow. The available water capacity is high. Soil blowing and water erosion are slight hazards.

Representative profile of Mangum clay, in an area of Mangum and Colorado soils, in a pasture 25 feet west of a county road, from a point 0.33 mile north of the Colorado River bridge below the dam of Lake J. B. Thomas:

A1—0 to 7 inches, reddish-brown (5YR 5/4) clay, reddish brown (5YR 4/4) moist; moderate, fine to medium, blocky structure; very hard, firm, sticky; few very fine pores; few roots; calcareous; moderately alkaline; clear, smooth boundary.

C—7 to 24 inches, reddish-brown (5YR 5/4) clay, reddish brown (5YR 4/4) moist; massive; extremely hard, firm, sticky; cracks 1½ centimeters wide extend to bottom of horizon; few very fine pores; calcareous; moderately alkaline; gradual, smooth boundary.

A1b—24 to 48 inches +, red (2.5YR 4/6) clay, dark red (2.5YR 3/6) moist; massive; extremely hard, firm, sticky; few, fine, hard calcium carbonate concretions in lower part; calcareous; moderately alkaline.

The A1 horizon ranges from 5 to 10 inches in thickness. The color ranges from reddish brown to brown. The texture ranges from silty clay loam to clay.

The C horizon ranges from reddish brown to dark reddish brown in color. The thickness ranges from 10 to 40 inches.

The A1b horizon ranges from silty clay to clay in texture. The color ranges from red to yellowish red.

Mangum and Colorado soils (Mc).—This undifferentiated group consists of Mangum and Colorado soils. These are nearly level soils on weakly concave bottom lands. The areas range from 200 to 2,000 feet in width and are continuous in length. They range from 30 to 150 acres in size. Most of the areas are dissected by meandering channels of intermittent streams and are subject to frequent flooding. The channels are 4 to 60 feet wide and 4 to 20 feet deep. The slope is mostly less than 1 percent, except on narrow benches, stream banks, and gullied areas, where it is as much as 4 percent.

Any given area may consist of a mixture of Mangum and Colorado soils or of only one of these soils. Of the total acreage, approximately 58 percent is Mangum soils and 41 percent is Colorado soils.

These soils have the profile described as representative of their respective series.

Included in mapping were a few small areas of Spur clay loam.

These soils are used for range. (Capability unit VIs–2, dryland; Clay Flat range site)

Mansker Series

The Mansker series consists of deep, nearly level to gently sloping, friable, moderately permeable, calcareous soils. These soils are on uplands.

In a representative profile the surface layer is dark-brown loam about 7 inches thick. The next layer consists of about 10 inches of brown clay loam. The

underlying material, to a depth of about 38 inches, is pink clay loam that is about 30 percent, by volume, calcium carbonate. Below this, to a depth of 62 inches, is reddish-yellow clay loam.

Representative profile of Mansker loam, 1 to 3 percent slopes, in a cultivated field 50 feet west of Farm Road 644, from a point 3.8 miles south of Hermleigh:

Ap—0 to 7 inches, dark-brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; weak granular structure; slightly hard, friable; few, hard, fine concretions of calcium carbonate on surface; calcareous; moderately alkaline; abrupt, smooth boundary.

B—7 to 17 inches, brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; weak, coarse, prismatic structure parting to weak subangular blocky; hard, friable; few, hard, fine calcium carbonate concretions; common worm casts; many fine pores; calcareous; moderately alkaline; clear, wavy boundary.

C1ca—17 to 38 inches, pink (7.5YR 8/4) clay loam, pink (7.5YR 7/4) moist; massive; hard, friable; many soft lumps and few hard concretions of calcium carbonate that make up about 30 percent, by volume, of the horizon; calcareous; moderately alkaline; gradual, wavy boundary.

C2—38 to 62 inches +, reddish-yellow (5YR 6/6) clay loam, yellowish red (5YR 5/6) moist; massive; hard, friable; common hard concretions and soft lumps of calcium carbonate that make up about 15 to 20 percent, by volume, of the horizon; calcareous; moderately alkaline.

The A horizon ranges from 5 to 9 inches in thickness. The color ranges from dark brown to reddish brown.

The B horizon ranges from 6 to 15 inches in thickness and from loam to clay loam in texture. The color ranges from brown to reddish brown.

The depth to the C1ca horizon ranges from 11 to 20 inches. The color ranges from pink to reddish yellow. Soft masses and hard concretions of calcium carbonate make up an estimated 15 to 50 percent, by volume, of this horizon.

The depth to the C2 horizon ranges from 30 to 48 inches. The color ranges from pink to yellowish red. Soft lumps and hard concretions of calcium carbonate make up an estimated 2 to 25 percent, by volume, of this horizon.

Mansker loam, 0 to 1 percent slopes (MkA).—This soil is on uplands. The areas are oval to elongated in shape and range from 12 to 76 acres in size. In most places the slope is between 0.2 and 1.0 percent.

The surface layer is dark-brown loam about 8 inches thick. The next layer is brown clay loam about 15 inches thick. The underlying material consists of calcareous, pink, friable, loamy sediments that contain many free lime carbonates.

Included in mapping were small areas of Mansker loam, 1 to 3 percent slopes; Potter soils; and small areas, less than 2 acres in size, of Weymouth clay loam.

Nearly all of this soil is cultivated. A few small areas are used for range. Soil blowing and water erosion are slight hazards. This soil is well drained, and runoff is medium. The available water capacity is high. (Capability unit IIIe–6, dryland; IIIs–2, irrigated; Deep Hardland range site)

Mansker loam, 1 to 3 percent slopes (MkB).—This soil is on convex slopes. The areas range from 20 to 120 acres in size. They are long and narrow where the soil is along intermittent drainageways and are irregularly shaped in areas away from drainageways. The slope ranges from 1 to 3 percent but averages about 1.8 percent.

This soil has the profile described as representative of the series.

Included in mapping were small areas of Weymouth clay loam, Spade fine sandy loam, Veal fine sandy loam, and Colorado and Spur soils along intermittent drainageways. Also included were small areas of Potter soils.

About 50 percent of the acreage is cultivated, and a few small areas are irrigated. The remaining areas are used for range. Soil blowing is a slight hazard. Water erosion is a moderate hazard. Sheet erosion is slight, but some shallow gullies have formed along intermittent drainageways and on cultivated areas where runoff water concentrates. The available water capacity is high. This soil is well drained, and runoff is medium. (Capability unit IIIe–7, dryland; IIIe–7, irrigated; Deep Hardland range site)

Mansker loam, 3 to 5 percent slopes (MkC).—This soil is on convex slopes. The areas are mainly adjacent to or above small streams and creeks. They range from 20 to 80 acres in size and are oblong in shape. The slope averages about 4 percent.

The surface layer is brown loam about 5 inches thick. The next layer is reddish-brown clay loam about 8 inches thick. The underlying material is calcareous pink clay loam high in carbonates.

Included in mapping were small areas of Potter soils; Veal fine sandy loam; Spade fine sandy loam; and Mansker loam, 1 to 3 percent slopes.

Most of this soil is used for range. A few areas are cultivated. Soil blowing is a slight hazard, and water erosion is a severe hazard. A few shallow rills and gullies have formed in some areas. The gullies are 6 to 16 inches deep and 12 to 80 inches wide; they are in areas where water has concentrated. (Capability unit IVe–2, dryland; IVe–5, irrigated; Deep Hardland range site)

Mansker-Potter complex (Mp).—This complex (fig. 8) consists of gently sloping Mansker soils and gently sloping to sloping Potter soils. The areas are irregular in shape and range from 20 to several hundred acres in size.

Mansker loam makes up about 55 percent of this complex; Potter soils, about 41 percent; and other soils, about 4 percent. Potter soils have a surface layer of pale-brown fine sandy loam to clay loam about 6 inches thick. This layer rests on pink weakly cemented caliche material. Mansker loam has a surface layer of brown loam about 7 inches thick. The next layer is reddish-brown clay loam about 9 inches thick. The underlying material consists of loamy sediments that contain many free lime carbonates.

Potter soils occupy small circular outcrops and narrow ridges and ledges. Mansker loam is between the outcrops and in the less sloping areas between the ledges and ridges.

Included in mapping were small areas of Weymouth clay loam, Colorado and Spur soils, Veal fine sandy loam, Spade fine sandy loam, and Olton clay loam.

Most of the areas are used for range. The Mansker soil is suitable for cultivation, but it is so intricately associated with Potter soils and in such small acreages that cultivating it is impractical. (Capability unit VIe–2, dryland; Very Shallow range site)

Figure 8.—**An area of Mansker-Potter complex.**

Miles Series

The Miles series consists of deep, nearly level to gently sloping, moderately permeable, well-drained soils. These soils are on broad uplands. They developed in calcareous old alluvium, mostly of Quaternary age.

In a representative profile the surface layer is brown fine sandy loam about 8 inches thick. Below this layer is 8 inches of reddish-brown sandy clay loam. The next layer is yellowish-red sandy clay loam about 36 inches thick. The next lower layer, about 8 inches thick, is pink sandy clay loam that contains an accumulation of calcium carbonate. The underlying material, to a depth of 70 inches, is pink sandy clay loam that has a high content of calcium carbonate.

Representative profile of Miles fine sandy loam, in an area of Miles and Cobb fine sandy loams, 1 to 3 percent slopes, in a cultivated field 60 feet west of a county road, from a point 2.15 miles southeast on U.S. Highway 84 from the Scurry County Courthouse, 0.65 mile north on the county road:

Ap—0 to 8 inches, brown (7.5YR 5/4) fine sandy loam, dark brown (7.5YR 3/4) moist; weak granular structure; hard, friable; few fine pores; neutral; abrupt, smooth boundary.

B1—8 to 16 inches, reddish-brown (5YR 4/4) sandy clay loam, dark reddish brown (5YR 3/4) moist; weak, very coarse, prismatic structure parting to weak subangular blocky; very hard, friable; common fine pores; neutral; clear, smooth boundary.

B21t—16 to 33 inches, yellowish-red (5YR 4/6) sandy clay loam, yellowish red (5YR 3/6) moist; moderate to very coarse prismatic structure parting to weak to moderate, medium, subangular blocky; very hard, friable; few discontinuous clay films; common fine pores; noncalcareous; mildly alkaline; gradual, smooth boundary.

B22t—33 to 52 inches, yellowish-red (5YR 5/8) sandy clay loam, yellowish red (5YR 4/8) moist; weak, subangular blocky structure; hard, friable; few fine pores; noncalcareous; mildly alkaline; clear, wavy boundary.

B3ca—52 to 60 inches, pink (5YR 7/4) sandy clay loam, light reddish brown (5YR 6/4) moist; weak, subangular blocky structure; hard, friable; common soft lumps and segregated calcium carbonate that make up an estimated 15 percent, by volume, of the horizon; calcareous; moderately alkaline; diffuse, wavy boundary.

C—60 to 70 inches +, pink (5YR 7/4) sandy clay loam, light reddish brown (5YR 6/4) moist; massive; common soft lumps of calcium carbonate that make up an estimated 4 to 8 percent, by volume, of the horizon; calcareous; moderately alkaline.

In areas where the A horizon is fine sandy loam, the thickness of that horizon ranges from 7 to 12 inches; where it is loamy fine sand, the thickness ranges from 10 to 20 inches. The color ranges from reddish brown to brown.

The B1 horizon ranges from 4 to 10 inches in thickness. The structure ranges from weak, medium to very coarse, prismatic and weak, subangular blocky. Reaction is neutral to mildly alkaline.

The B2t horizon ranges from 20 to 58 inches in thickness and from red to reddish yellow in color. The texture ranges from sandy clay loam to clay loam. Reaction ranges from neutral to moderately alkaline. The structure ranges from moderate to very coarse prismatic to weak or moderate, medium, subangular blocky.

The B3ca horizon ranges from 6 to 18 inches in thickness and from pinkish white to pink in color. Soft lumps and segregated calcium carbonate make up an estimated 5 to 30 percent of this horizon, by volume.

The depth to the C horizon ranges from 60 to 80 inches. The color ranges from pinkish white to yellowish red. Soft lumps of calcium carbonate make up an estimated 1 to 10 percent of this horizon, by volume.

Miles fine sandy loam, 0 to 1 percent slopes (MrA).—This soil is on smooth uplands. In most places the slope is between 0.3 and 0.7 percent. The areas range from 20 to 180 acres in size and are irregular to oval in shape.

The surface layer is brown fine sandy loam about 10 inches thick. The next layer is reddish-brown sandy clay loam in the upper part and yellowish-red sandy clay loam in the lower part. The underlying material consists of calcareous, moderately sandy to sandy, water-laid material.

Included in mapping were small areas of Olton loam; Miles loamy fine sand; and Miles and Cobb fine sandy loams, 1 to 3 percent slopes.

Nearly all of this soil is cultivated. The available water capacity is high, and surface runoff is slow. Soil blowing is a moderate hazard. In some cultivated areas wind has removed some of the silt and clay of the plowed layer, and in these places the surface layer is sandier than in areas where the soil is under native vegetation. (Capability unit IIIe–4, dryland; IIe–4, irrigated; Sandy Loam range site)

Miles and Cobb fine sandy loams, 1 to 3 percent slopes (MsB).—This undifferentiated group consists of gently sloping soils in areas where the slopes are convex. About 64 percent of the acreage is Miles fine sandy loam, 34 percent is Cobb fine sandy loam, and 2 percent is other soils. In any given area the unit may consist of one or the other of the major soils or of a mixed pattern of both. The areas range from 20 acres to several hundred acres in size and are irregular in shape. The slope averages about 2 percent.

These soils have the profile described as representative of their respective series.

Included in mapping were small areas of Miles loamy fine sand, 0 to 3 percent slopes; Spade fine sandy loam; Olton loam; Mansker loam; Veal fine sandy loam; and Miles fine sandy loam, 0 to 1 percent slopes; and Miles and Cobb fine sandy loams, 3 to 5 percent slopes.

About 80 to 85 percent of the acreage is cultivated, and some areas are irrigated. The available water ca-

pacity is high. Surface runoff is medium. Soil blowing is a moderate hazard, and water erosion is a slight to moderate hazard. In the steeper areas a few shallow gullies, 10 to 16 inches deep and 2 to 12 feet wide, have formed. Soil blowing has removed some of the silt and clay of the plowed layer in most cultivated areas, and in these places the surface layer is sandier than in uncultivated areas. (Capability unit IIIe–4, dryland; IIe–5, irrigated; Sandy Loam range site)

Miles and Cobb fine sandy loams, 3 to 5 percent slopes (MsC).—This undifferentiated group consists of gently sloping soils on convex ridges and on side slopes along natural drainageways. About 56 percent of the acreage is Miles fine sandy loam, 41 percent is Cobb fine sandy loam, and 3 percent is other soils. In any given area the unit may consist of one or the other of the major soils or of a mixed pattern of both. The areas range from 20 to 30 acres in size and are oblong in shape. The slope averages about 4 percent.

The Miles soil has a surface layer of reddish-brown fine sandy loam about 7 inches thick. The next layer is reddish-brown to yellowish-red sandy clay loam. Below this is calcareous, moderately sandy to sandy, water-laid material. The Cobb soil has a surface layer of reddish-brown fine sandy loam about 8 inches thick. The next layer, about 34 inches thick, consists of reddish-brown sandy clay loam in the upper part and yellowish-red sandy clay loam in the lower part. The underlying material is weakly cemented, yellowish-brown sandstone.

Included in mapping were small areas of Spade fine sandy loam; Veal fine sandy loam; Mansker loam; and Miles and Cobb fine sandy loams, 1 to 3 percent slopes.

About 50 percent of the acreage is cultivated. The rest is used for range. Soil blowing and water erosion are moderate hazards. Soil blowing has removed some of the silt and clay of the plowed layer in most cultivated fields, and in these places the surface layer is sandier than in uncultivated areas. Sheet erosion has removed 2 to 5 inches of the topsoil in some cultivated areas. Where runoff water has concentrated, a few shallow gullies have formed. These gullies are 10 to 22 inches deep and 2 to 12 feet wide. (Capability unit IVe–4, dryland; IIIe–3, irrigated; Sandy Loam range site)

Miles loamy fine sand, 0 to 3 percent slopes (MuB).—This soil is on uplands. The areas are irregular in shape and range from 30 to several hundred acres in size. The slope averages about 2 percent.

The surface layer is brown to reddish-brown loamy fine sand about 16 inches thick. The next layer is reddish-brown sandy clay loam about 48 inches thick. Below this is moderately sandy to sandy, water-laid material.

Included in mapping were small areas of Miles fine sandy loam and a few areas of Brownfield fine sand.

Most of this soil is cultivated, and some is irrigated. The available water capacity is moderate. Soil blowing is a moderate to severe hazard. In some cultivated areas wind has removed some of the silt and clay of the plowed layer, and in these places the surface layer is sandier than in uncultivated areas. (Capability unit IVe–6, dryland; IIIe–6, irrigated; Sandyland range site)

Olton Series

The Olton series consists of deep, nearly level to gently rolling, moderately slowly permeable soils on uplands. These soils are on plains and ridges. They developed in reddish, calcareous old alluvium derived from outwash materials.

The surface layer is dark-brown clay loam about 7 inches thick. The next layer is reddish-brown clay loam in the upper 11 inches, reddish-brown clay in the next 7 inches, and reddish-brown clay loam in the lower 13 inches. The underlying material, to a depth of 62 inches, is reddish-yellow clay loam. It contains 18 to 25 percent, by volume, segregated calcium carbonate in the upper 12 inches.

Representative profile of Olton clay loam, 1 to 3 percent slopes, in a cultivated field 100 feet north of a county road, from a point 4.0 miles south on Texas Highway 208, from junction with U.S. Highway 84, and thence 0.1 mile east:

Ap—0 to 7 inches, dark-brown (7.5YR 4/2) clay loam, dark brown (7.5YR 3/2) moist; weak granular structure to weak subangular blocky; hard, friable; many very fine and fine pores; noncalcareous; mildly alkaline; abrupt, smooth boundary.

B21t—7 to 18 inches, reddish-brown (5YR 4/3) clay loam, dark reddish brown (5YR 3/3) moist; moderate, medium, blocky structure; very hard, firm, slightly sticky; thin clay films; common fine pores; noncalcareous; mildly alkaline; clear, smooth boundary.

B22t—18 to 25 inches, reddish-brown (5YR 4/4) clay, dark reddish brown (5YR 3/4) moist; moderate, medium, blocky structure; very hard, very firm, sticky; thin, continuous clay films; noncalcareous; mildly alkaline; gradual, smooth boundary.

B23t—25 to 38 inches, reddish-brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) moist; moderate, medium, subangular blocky structure and weak, fine, blocky; very hard, firm, sticky; few patchy clay films; noncalcareous; mildly alkaline; clear, wavy boundary.

C1ca—38 to 50 inches, reddish-yellow (5YR 6/6) clay loam, yellowish red (5YR 5/6) moist; massive; hard, friable; common to many hard concretions and soft lumps of calcium carbonate that make up about 18 to 25 percent, by volume, of this horizon; calcareous; moderately alkaline; gradual, wavy boundary.

C2—50 to 62 inches +, reddish-yellow (5YR 6/6) clay loam, yellowish red (5YR 5/6) moist; massive; hard, friable; few to common soft masses of calcium carbonate that make up about 2 to 10 percent, by volume, of this horizon; calcareous; moderately alkaline.

The A horizon ranges from 6 to 10 inches in thickness and from brown to reddish brown in color. The texture ranges from loam to clay loam.

The B2t horizons range from clay loam to clay in texture and from 25 to 44 inches in thickness. The color ranges from dark reddish brown to reddish yellow. The structure ranges from weak to moderate, medium, subangular blocky to blocky.

The depth to the C1ca horizon ranges from 31 to 54 inches. The color ranges from pink to yellowish red. Soft lumps and hard concretions of calcium carbonate make up an estimated 10 to 40 percent, by volume, of this horizon.

The depth to the C2 horizon ranges from 46 to 70 inches. The color ranges from yellowish red to reddish yellow. Soft masses of calcium carbonate make up an estimated 2 to 15 percent, by volume, of this horizon.

Olton clay loam, 0 to 1 percent slopes (OcA).—This soil is on uplands. The areas are irregular in shape and range from 20 to several hundred acres in size.

The surface layer is brown clay loam about 9 inches thick. The next layer is reddish-brown clay loam about 31 inches thick. The underlying material is pink to reddish-yellow, calcareous clay loam.

Included in mapping were small areas of Abilene clay loam; Olton loam, 1 to 3 percent slopes; and Olton clay loam, 1 to 3 percent slopes.

About 80 percent of the acreage is cultivated, and a few areas are irrigated. The remaining 20 percent is used for range. The available water capacity is high. This soil is well drained, and surface runoff is slow. Soil blowing is a slight hazard. (Capability unit IIce–4, dryland; I–1, irrigated; Deep Hardland range site)

Olton clay loam, 1 to 3 percent slopes (OcB).—This soil is on uplands. The areas are elongated to irregular in shape and range from 15 to several hundred acres in size. The slope averages about 1.9 percent.

This soil has the profile described as representative of the series.

Included in mapping were small areas of Olton loam; Olton clay loam, 0 to 1 percent slopes; and small ridges of Weymouth clay loam and Mansker loam.

This soil is used for both range and crops.

Water erosion is a moderate hazard. In some areas, 1 to 3 inches of the topsoil has been removed by sheet erosion. A few shallow gullies, 6 to 14 inches deep and 1 to 5 feet wide, have formed in areas where runoff water has concentrated. The available water capacity is high. This soil is well drained, and surface runoff is medium. (Capability unit IIIe–2, dryland; IIe–1, irrigated; Deep Hardland range site)

Olton loam, 0 to 1 percent slopes (OlA).—This soil is in smooth, weakly convex areas. The slope is mainly between 0.4 and 1.0 percent but averages about 0.6 percent. The areas range from 15 to 150 acres in size and are irregular in shape.

The surface layer is brown loam about 9 inches thick. The next layer is clay loam that is reddish brown in the upper part and yellowish red in the lower part. The depth to the underlying material is about 33 inches. This material is reddish and calcareous.

Included in mapping were small areas of Olton clay loam; Miles fine sandy loam; Abilene clay loam; Mansker loam; and Olton loam, 1 to 3 percent slopes.

Most of this soil is cultivated, and a few small areas are irrigated. The available water capacity is high. The soil is well drained, and surface runoff is slow. Soil blowing and water erosion are slight hazards. (Capability unit IIce–4, dryland; I–1, irrigated; Deep Hardland range site)

Olton loam, 1 to 3 percent slopes (OlB).—This soil is on convex slopes. The slope averages about 1.8 percent. The areas are elongated to irregular in shape and range from 20 to 150 acres in size.

The surface layer is brown loam about 8 inches thick. The next layer is reddish-brown clay in the upper part and yellowish-brown clay loam in the lower part. The underlying material is reddish and calcareous.

Included in mapping were small areas of Miles fine sandy loam; Olton clay loam; Mansker loam; and Olton loam, 0 to 1 percent slopes.

A large percentage of the acreage is cultivated. The available water capacity is high. This soil is well drained, and surface runoff is medium. A few small areas are irrigated. Soil blowing is a slight hazard, and water erosion is a moderate hazard. In cultivated areas a few shallow gullies, 4 to 6 inches deep and 2 to 6 feet wide, have been cut on some of the side slopes where runoff water has concentrated. (Capability unit IIIe–2, dryland; IIe–1, irrigated; Deep Hardland range site)

Potter Series

The Potter series consists of gently sloping to steep, moderately permeable soils that are shallow to very shallow over weakly cemented caliche. These soils are on ridges and knolls of uplands.

In a representative profile the surface layer is pale-brown loam about 6 inches thick. The underlying material is pinkish-gray, weakly cemented, platy caliche about 7 inches thick. Below this, to a depth of 20 inches, is pink, weakly cemented caliche.

Representative profile of Potter loam, in an area of Potter soils in a pasture 0.1 mile west of Polar Road, from a point 8.0 miles north of the junction of Polar Road and U.S. Highway 84:

A1—0 to 6 inches, pale-brown (10YR 6/3) loam, brown (10YR 5/3) moist; weak subangular blocky and granular structure; hard, friable; few specks of calcium carbonate; few fragments of caliche; calcareous; moderately alkaline; abrupt, smooth boundary.

Cca—6 to 13 inches, pinkish-gray (7.5YR 7/2), weakly cemented, platy caliche that contains roots and soft calcium carbonate between plates, pinkish gray (7.5YR 6/2) moist.

R—13 to 20 inches +, pink (7.5YR 7/4), weakly cemented caliche, light brown (7.5YR 6/4) moist.

The A horizon ranges from 4 to 10 inches in thickness and from grayish brown to pale brown in color. The texture ranges from fine sandy loam to clay loam. Fragments of caliche and gravel range from few to common on the surface and in the soil.

The Cca horizon ranges from pink to white in color. This horizon is soft calcareous earth that is 50 to 80 percent, by volume, soft and hard caliche.

The depth to the R layer ranges from 9 to 20 inches.

Potter soils (Pt).—These soils are on upland ridges and knolls and along natural drainageways. They are gently sloping to steep. The areas are elongated to irregular in shape and range from 20 to 600 acres in size. The surface layer is fine sandy loam to clay loam.

Included in mapping were small areas of Mansker loam, Kimbrough soils, Berda loam, and Weymouth clay loam.

Potter soils are too shallow for cultivation. They are used for range. Water erosion is a moderate to severe hazard. The available water capacity is low. These soils are well drained, and surface runoff is medium to rapid. (Capability unit VIIs–1, dryland; Very Shallow range site)

Quinlan Series

The Quinlan series consists of gently sloping to steep, moderately rapidly permeable, shallow soils on uplands. These soils developed in material weathered from soft sandstone of the Permian period. They are on convex slopes.

In a representative profile the surface layer is yellowish-red loam about 15 inches thick. Below this, to a depth of 24 inches, is yellowish-red soft sandstone.

Representative profile of Quinlan loam, in an area of Quinlan soils in a pasture 3.4 miles north of Camp Springs, on county road, 1.6 miles north and east on ranch road, and thence 1.75 miles from the point where ranch road turns northeast:

A1—0 to 7 inches, yellowish-red (5YR 5/6) loam, yellowish red (5YR 4/6) moist; weak granular structure; soft to slightly hard, friable; few to common very fine root hairs and pores; calcareous; mildly alkaline; clear, smooth boundary.

B—7 to 15 inches, yellowish-red (5YR 5/6) loam, yellowish red (5YR 4/6) moist; weak subangular blocky structure; slightly hard, friable; few very fine pores and root hairs; few films and threads in lower part; calcareous; moderately alkaline; abrupt, wavy boundary.

R—15 to 24 inches +, yellowish-red (5YR 4/6) soft sandstone specked with blue; a few roots along fractures in upper 4 inches.

The A horizon ranges from 5 to 10 inches in thickness and from red to reddish yellow in color. Reaction ranges from neutral to moderately alkaline. The texture ranges from loam to very fine sandy loam.

The B horizon ranges from loam to very fine sandy loam in texture. It ranges from 5 to 10 inches in thickness and from reddish brown to reddish yellow in color. The structure ranges from weak granular to weak subangular blocky.

The depth to the R layer ranges from 10 to 20 inches.

Quinlan soils (Qu).—These soils are gently sloping to steep. They are characterized by drainageways, ridges, knolls, and bluffs of Permian sandstone material. The areas are irregular in shape and range from 100 to several hundred acres in size. The slope ranges from 2 to 50 percent. The texture of the surface layer ranges from loam to very fine sandy loam.

Included in mapping were small areas of Colorado and Spur soils, Woodward loam, Carey loam, and Rough broken and stony land.

These soils are used for range. Water erosion is a moderate to severe hazard. A few shallow to deep, dissected gullies have been cut into the sandstone material by geologic erosion. The soils are well drained. The available water capacity is low. (Capability unit VIe–4, dryland; Mixedland range site)

Roscoe Series

The Roscoe series consists of deep, nearly level, very slowly permeable, moderately well drained, clayey soils. These soils are in slightly depressed, concave areas. They developed in calcareous, clayey, old alluvium or outwash of Quaternary age.

In a representative profile the surface layer is dark-gray clay about 17 inches thick. The next layer is dark-gray calcareous clay about 28 inches thick. This layer has cracks at least 1 centimeter wide that extend to a depth of 20 inches or more. The underlying material, to a depth of 64 inches, is gray massive clay high in calcium carbonate.

Representative profile of Roscoe clay, in a cultivated field 90 feet west of Farm Road 644, from a point 1.2 miles south of Hermleigh:

Ap—0 to 7 inches, dark-gray (10YR 4/1) clay, very dark gray (10YR 3/1) moist; weak granular structure; very hard, firm, sticky and plastic; mildly alkaline; abrupt, smooth boundary.

A1—7 to 17 inches, dark-gray (10YR 4/1) clay, very dark gray (10YR 3/1) moist; weak blocky structure to massive; extremely hard, very firm, sticky and plastic; mildly alkaline; gradual, wavy boundary.

AC—17 to 45 inches, dark-gray (10YR 4/1) clay, very dark gray (10YR 3/1) moist; weak, fine to medium, blocky structure to massive; extremely hard, very firm, sticky and plastic; calcareous; moderately alkaline; gradual, wavy boundary.

Cca—45 to 64 inches +, gray (10YR 5/1) clay, dark gray (10YR 4/1) moist; massive; extremely hard, very firm, sticky and plastic; few to common soft lumps of calcium carbonate that increase with depth and few, fine, hard calcium carbonate concretions; calcareous; moderately alkaline.

The A horizon ranges from 10 to 18 inches in thickness and from dark gray to gray in color. Reaction is neutral to moderately alkaline.

The AC horizon ranges from dark gray to very dark gray in color and from 22 to 36 inches in thickness.

The depth to the Cca horizon ranges from 32 to 54 inches.

Roscoe clay (Rc).—This nearly level soil occupies concave, slightly depressed areas. The areas are circular to oval in shape and range from 20 to 80 acres in size. The slope ranges from 0.2 to 0.6 percent.

Included in mapping were small, circular, and lower lying areas of Lipan clay and narrow bands of Rowena-Abilene complex.

This soil is suitable for crops if surface drainage is provided. Most of the acreage is cultivated. Some small areas are used for range. The available water capacity is high. Surface runoff is very slow. (Capability unit IIIw–1, dryland; Deep Hardland range site)

Rough Broken and Stony Land

Rough broken and stony land (Ro) consists of steep, rough, broken and stony areas of limestone materials, sandstone materials, and clayey red-bed materials. The topography consists of an escarpment of limestone material that is nearly vertical in places and ranges from 5 to 75 feet in height. Below this escarpment is an area of sandstone material, 40 to 150 feet wide, where the slope ranges from 40 to 50 percent. This area is covered with sandstone and limestone boulders that have fallen from the escarpment above. The boulders are as much as 6 feet in diameter. Below this area, clayey red-bed materials, 60 to 160 feet wide, are exposed. In this area some spots are covered with sandstone and limestone boulders, 1 to 3 feet in diameter, from the higher lying materials (fig. 9).

Soil development is limited to a thin mantle, 1 to 3 inches thick, of weathered material. In a few places erosion has cut deep, large gullies. Some are 20 to 30 feet deep near the heads of drainageways. The gully walls are nearly vertical in some places. Gypsum crops out in some places along the gully walls and bluffs.

In a few places areas of Badland were included in mapping. These areas occupy irregularly shaped bands 90 acres to several hundred acres in size. They make up as much as 15 percent of the acreage.

About 10 to 15 percent of the less sloping areas and 55 to 75 percent of the steeper areas are inaccessible to cattle. The vegetation is sparse. About 15 to 35 percent

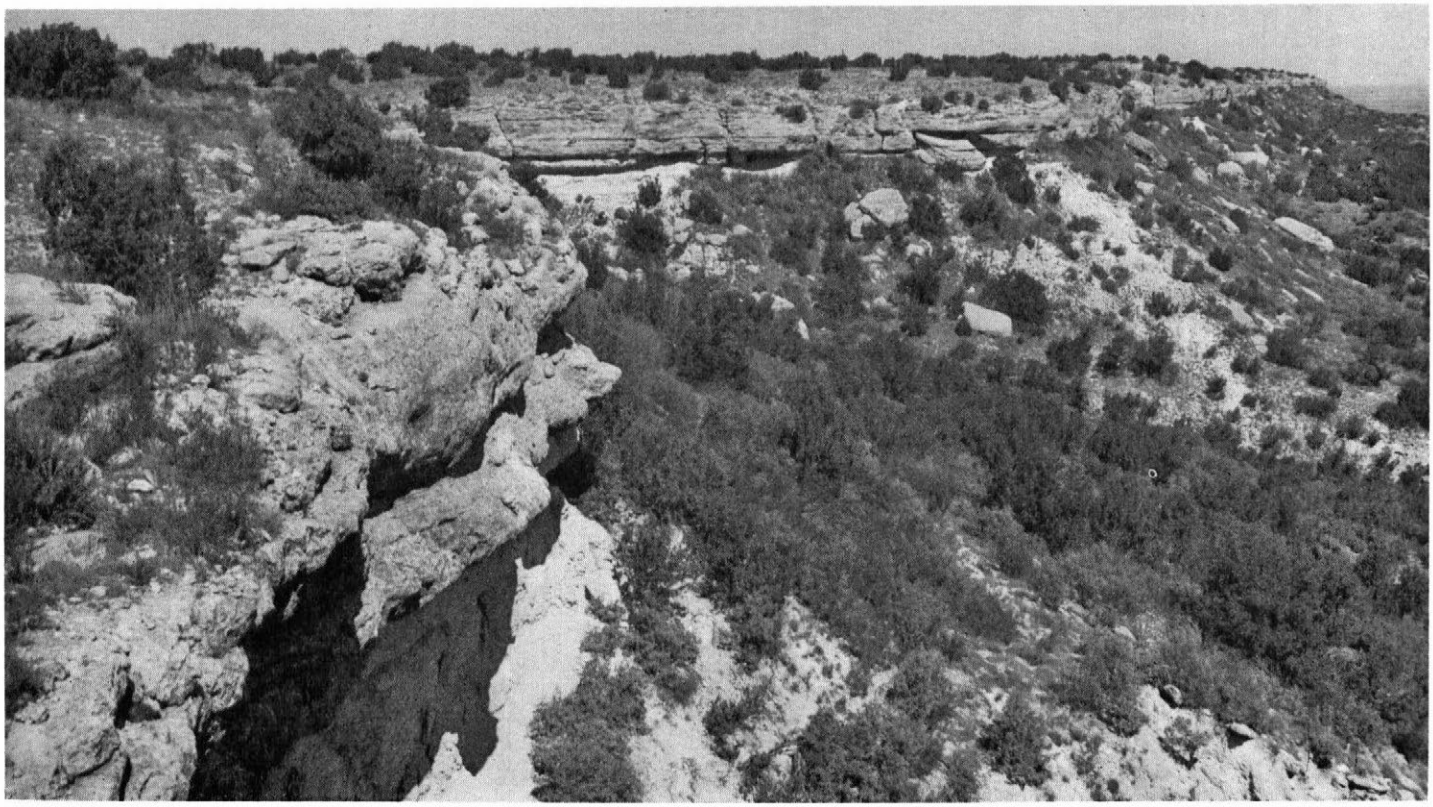

Figure 9.—An area of Rough broken and stony land.

of the surface in the less sloping areas and 50 to 85 percent in the steeper areas is bare.

This land type is nonarable. Erosion is a severe hazard. (Capability unit VIIs–2; Rough Broken range site)

Rowena Series

The Rowena series consists of deep, nearly level to gently sloping, moderately slowly permeable, calcareous soils. These soils are on broad uplands. In this county they are mapped only in a complex with Abilene soils.

In a representative profile the surface layer is dark-brown clay loam about 7 inches thick. Below this layer is 31 inches of dark-brown clay that contains calcium carbonate accumulations in the lower 8 inches. Cracks at least 1 centimeter wide extend to a depth of 20 inches at some time in most years. The underlying material is pink silty clay loam in the upper 15 inches. Below this, to a depth of 62 inches, is reddish-yellow silty clay loam.

The available water capacity is high.

Representative profile of Rowena clay loam, in an area of Rowena-Abilene complex, 0 to 1 percent slopes, in a cultivated field 100 feet north of a county road, from a point 1.6 miles south on U.S. Highway 84 from Hermleigh, and 0.4 mile east on county road:

Ap—0 to 7 inches, dark-brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; weak subangular blocky structure and weak granular structure; hard, friable; few fine pores; few roots; calcareous; moderately alkaline; abrupt, smooth boundary.

B21—7 to 16 inches, dark-brown (7.5YR 4/2) clay, dark brown (7.5YR 3/2) moist; weak to moderate, fine to medium, blocky structure; very hard, firm; distinct pressure faces on horizontal faces of peds; few discontinuous slickensides; few very fine pores; calcareous; moderately alkaline; clear, smooth boundary.

B22—16 to 30 inches, dark-brown (7.5YR 4/3) clay, dark brown (7.5YR 3/3) moist; moderate, medium, blocky structure; very hard, firm; few discontinuous slickensides; common pressure faces; few, fine, hard calcium carbonate concretions in lower part of horizon; calcareous; moderately alkaline; gradual, wavy boundary.

B3ca—30 to 38 inches, dark-brown (7.5YR 4/4) clay, dark brown (7.5YR 4/3) moist; weak, fine, blocky structure; very hard, firm; few, fine to medium, hard calcium carbonate concretions; calcareous; moderately alkaline; clear, wavy boundary.

C1ca—38 to 53 inches, pink (5YR 7/4) silty clay loam, reddish yellow (5YR 6/6) moist; massive; hard, friable; many soft masses of calcium carbonate make up an estimated 25 percent, by volume, of this horizon; calcareous; moderately alkaline; gradual, wavy boundary.

C2—53 to 62 inches, reddish-yellow (5YR 6/6) silty clay loam, yellowish red (5YR 5/6) moist; massive; hard, friable; common soft masses of calcium carbonate make up about 15 percent, by volume, of this horizon; calcareous; moderately alkaline.

The A horizon ranges from 5 to 12 inches in thickness and from brown to dark grayish brown in color. The texture ranges from clay loam to silty clay loam.

The color of the B2 horizons ranges from brown to very dark grayish brown. The structure ranges from weak to moderate, fine to medium, blocky.

The depth to the C1ca horizon ranges from 30 to 40 inches. The color ranges from pink to yellowish red. Soft lumps and hard concretions of calcium carbonate make up an estimated 15 to 40 percent, by volume, of this horizon.

The depth to the C2 horizon ranges from 46 to 64 inches.

Rowena-Abilene complex, 0 to 1 percent slopes (RwA).—This complex consists of nearly level soils on broad uplands. The areas are irregular and roughly circular in shape and range from 40 to several hundred acres in size. The slope is mainly 0.2 to 0.7 percent. The composition of this complex averages about 60 percent Rowena soils and 40 percent Abilene soils.

The Rowena component has the profile described as representative of the Rowena series. The Abilene component has the profile described as representative of the Abilene series.

Included in mapping were small areas of Olton clay loam, Mansker loam, Roscoe clay, and Rowena-Abilene complex, 1 to 3 percent slopes.

Nearly all of this complex is cultivated. The soils are well drained, and surface runoff is slow. Soil blowing is a slight hazard. (Capability unit IIce–4, dryland; I–1, irrigated; Deep Hardland range site)

Rowena-Abilene complex, 1 to 3 percent slopes (RwB).—This complex consists of gently sloping soils in convex areas along natural drainageways. The areas range from 40 to 160 acres in size and are oval and elongated in shape. The slope is mainly 1.5 to 2.5 percent. The composition of this complex averages about 65 percent Rowena soils and 35 percent Abilene soils.

The Rowena component has a surface layer of calcareous clay loam to silty clay loam about 6 inches thick and dark brown in color. The next layer is brown clay about 28 inches thick. Cracks at least 1 centimeter wide extend to a depth of 20 inches at some time in most years. The underlying material is pinkish, calcareous, and loamy.

The Abilene component has a surface layer of brown clay loam about 6 inches thick. The next layer is dark grayish-brown silty clay loam about 36 inches thick. The underlying material is pink silty clay loam that has a high content of calcium carbonate.

Included in mapping were small areas of Rowena-Abilene complex, 0 to 1 percent slopes, Olton clay loam, and Mansker loam.

Most of this complex is cultivated. The soils are well drained, and surface runoff is medium. Soil blowing is a slight hazard. Water erosion is a moderate hazard. In cultivated areas that have not been terraced, a few shallow gullies, 5 to 10 inches deep and 2 to 6 feet wide, have formed on some of the side slopes. (Capability unit IIIe–2, dryland; IIe–1, irrigated; Deep Hardland range site)

Slaughter Series

The Slaughter series consists of gently sloping, shallow soils that have indurated caliche at a depth of 11 to 20 inches. These soils are on uplands. In this county they are mapped only in a complex with Lea and Kimbrough soils.

In a representative profile the surface layer is dark-brown clay loam about 5 inches thick. The next layer is reddish-brown clay loam about 13 inches thick. The underlying material is white, indurated caliche.

This soil is well drained, and surface runoff is medium. The available water capacity is low. Permeability is moderately slow.

Representative profile of Slaughter clay loam, in an area of Lea-Kimbrough-Slaughter complex, in a pasture 2.5 miles east of Fluvanna, on Farm Road 612, 1.0 mile north on rural road, 2.3 miles north on ranch road, and 0.4 mile northwest in pasture:

A1—0 to 5 inches, dark-brown (7.5YR 4/3) clay loam, dark brown (7.5YR 3/3) moist; weak, medium, subangular blocky structure; hard, friable; many fine roots; neutral; clear, smooth boundary.

B2t—5 to 18 inches, reddish-brown (5YR 4/3) clay loam, dark reddish brown (5YR 3/3) moist; moderate, medium, blocky structure; very hard, firm, sticky; thin, nearly continuous clay films; few fine pores; few fine root hairs; mildly alkaline; clear, wavy boundary.

Ccam—18 to 20 inches +, white, indurated caliche.

The A horizon ranges from 4 to 8 inches in thickness. The color ranges from brown to dark grayish brown.

The B2t horizon ranges from 7 to 14 inches in thickness.

The depth to the Ccam horizon ranges from 11 to 20 inches. In most places the layer of indurated caliche is 1 to 3 feet thick over softer, more massive caliche that is several feet thick.

Spade Series

The Spade series consists of gently sloping, moderately permeable, moderately deep, calcareous soils. These soils formed in material weathered from sandstone. In this county they are mapped only in a complex with Latom soils.

In a representative profile the surface layer is brown fine sandy loam about 8 inches thick. The next layer is brown fine sandy loam about 16 inches thick. Below this, to a depth of 30 inches, is light yellowish-brown, weakly cemented, calcareous sandstone.

This soil is well drained, and surface runoff is medium. The available water capacity is low.

Representative profile of Spade fine sandy loam, in an area of Spade-Latom fine sandy loams, 1 to 3 percent slopes, in a pasture 55 feet east of a county road, from a point 2.5 miles east of Ira, on Farm Road 1606, and 2.0 miles north on county road:

A1—0 to 8 inches, brown (7.5YR 5/3) fine sandy loam, dark brown (7.5YR 4/3) moist; weak granular structure; slightly hard, very friable; few fine roots; few fine pores; calcareous; moderately alkaline; gradual, smooth boundary.

B—8 to 24 inches, brown (7.5YR 5/4) fine sandy loam, dark brown (7.5YR 4/4) moist; weak subangular blocky structure; slightly hard, very friable; few fine concretions and threads and films of calcium carbonate; few, fine to medium, sandstone fragments; few fine roots; calcareous; moderately alkaline; abrupt, wavy boundary.

R—24 to 30 inches +, light yellowish-brown (2.5Y 6/4), weakly cemented sandstone, light olive brown (2.5Y 5/4) moist; calcareous; moderately alkaline.

The A horizon ranges from 6 to 12 inches in thickness. The color ranges from reddish brown to yellowish brown.

The B horizon ranges from 12 to 20 inches in thickness. The color ranges from light reddish brown to light yellowish brown. The calcium carbonate content ranges from 2 to 20 percent, by volume, in the form of fine concretions, soft masses, and sandstone fragments coated with calcium carbonate.

The depth to weakly or strongly cemented sandstone ranges from 20 to 28 inches. The color ranges from brown to pale olive. Reaction is neutral to moderately alkaline.

Spade-Latom fine sandy loams, 1 to 3 percent slopes (SlB).—This complex consists of moderately deep Spade fine sandy loam and very shallow and shallow Latom fine sandy loam. The composition of this complex averages about 70 percent Spade fine sandy loam, 24 percent Latom fine sandy loam, and 6 percent other soils. These soils are on low ridges and along the side slopes of natural drainageways. Latom fine sandy loam generally occupies the ridgetops and about the upper one-fourth of the areas along natural drainageways. Spade fine sandy loam occupies about the lower three-fourths of the areas along natural drainageways and the slopes below the ridgetops occupied by Latom soils. The areas are elongated to irregular in shape and range from 20 to 60 acres in size. The slope averages about 2.3 percent.

The Spade component has the profile described as representative of the series. The Latom component has a surface layer of calcareous, brown fine sandy loam about 8 inches thick. The surface layer rests on calcareous, yellowish-brown sandstone.

Included in mapping were small areas of Cobb fine sandy loam in areas below the ridgetops, small areas of sandstone outcrops on the ridgetops, and some small ledges along natural drainageways.

This complex is used mostly for range, but a few areas are cultivated. Soil blowing and water erosion are moderate hazards. (Capability unit IVe–5, dryland; Sandy Loam range site)

Spade-Latom fine sandy loams, 3 to 5 percent slopes (SlC).—This complex consists of moderately deep Spade fine sandy loam and shallow to very shallow Latom fine sandy loam. It is made up of about 58 percent Spade fine sandy loam, about 36 percent Latom fine sandy loam, and about 6 percent other soils. It occupies the upper part of sandstone ridges and the side slopes of natural drainageways. Latom fine sandy loam occupies the ridgetops and about the upper one-fourth of the areas along natural drainageways. Spade fine sandy loam is on the lower three-fourths of the areas along natural drainageways. The slope ranges from 3 to 5 percent but averages about 4 percent. The areas are elongated in shape and range from 10 to 200 acres in size.

The Spade component has a surface layer of calcareous, brown fine sandy loam about 7 inches thick. The next layer is reddish-brown fine sandy loam about 14 inches thick. The underlying material is calcareous sandstone. The Latom component has a surface layer of brown fine sandy loam about 5 inches thick. The underlying material is calcareous, cemented sandstone.

Included in mapping were small areas of Cobb fine sandy loam below the ridgetops, small areas of sandstone outcrops on the ridgetops, and some small ledges along natural drainageways.

Nearly all of this complex is used for range. Soil blowing is a moderate hazard, and water erosion is a severe hazard. (Capability unit VIe–2, dryland; Sandy Loam range site)

Spur Series

The Spur series consists of deep, nearly level, moderately permeable soils that developed in calcareous, loamy alluvium. These soils are on flood plains.

In a representative profile the surface layer is dark-brown clay loam about 12 inches thick. The next layer is brown clay loam about 12 inches thick. The underlying material, to a depth of 62 inches, is brown clay loam stratified with silt loam to very fine sandy loam.

Representative profile of Spur clay loam, in a pasture 1.0 mile east of Farm Road 1611, from a point 3.0 miles north of the junction of Farm Road 1611 and U.S. Highway 180:

A1—0 to 12 inches, dark-brown (7.5YR 4/3) clay loam, dark brown (7.5YR 3/3) moist; weak, coarse, prismatic structure parting to weak to moderate, fine to medium, subangular blocky; hard, friable, slightly sticky; few films and threads of calcium carbonate; many very fine and fine roots; calcareous; moderately alkaline; gradual, smooth boundary.

B—12 to 24 inches, brown (7.5YR 5/4) clay loam, dark brown (7.5YR 3/4) moist; weak, coarse, prismatic structure parting to moderate, fine to medium, subangular blocky; hard, friable, slightly sticky; few films and threads of calcium carbonate; few fine roots; calcareous; moderately alkaline; gradual, smooth boundary.

C—24 to 62 inches +, brown (7.5YR 5/4) clay loam grading to reddish brown with depth; weak subangular blocky structure; hard, friable; few threads and films of calcium carbonate stratified with thin layers of silt loam to very fine sandy loam; calcareous; moderately alkaline.

The A1 horizon ranges from 5 to 20 inches in thickness. The color ranges from brown to dark grayish brown. The texture ranges from fine sandy loam to clay loam. The structure ranges from weak granular to moderate, fine to medium, subangular blocky.

The B horizon ranges from pale brown to dark grayish brown to reddish brown in color. The texture ranges from loam to silty clay loam.

The C horizon ranges from brown to reddish brown in color.

Spur clay loam (Sp).—This nearly level soil is on bottom lands. Most areas are subject to flooding every few years. The flooding is of short duration and does not severely damage crops or native vegetation. The areas range from 30 to several hundred acres in size and are long, narrow, and oblong in shape. They parallel the creeks and drainageways. The slope is between 0.2 and 0.8 percent.

This soil has the profile described as representative of the series.

Included in mapping were small areas of Mangum clay, Colorado clay loam, and Spur fine sandy loam.

This soil is well suited to crops, but only a small percentage is cultivated because the areas are long and narrow. The available water capacity is high. The soil is well drained, and surface runoff is slow. Soil blowing and water erosion are slight hazards. (Capability unit IIce–1, dryland; I–2, irrigated; Loamy Bottomland range site)

Spur fine sandy loam (Sr).—This nearly level soil is on bottom lands. The areas are oblong in shape and parallel the creeks and drainageways. They range from 20 to 200 acres in size. The slope is between 0.2 and 1 percent.

The surface layer is brown fine sandy loam about 7 inches thick. The next layer is dark grayish-brown clay loam about 16 inches thick. The underlying material is reddish-brown clay loam.

Included in mapping were small areas of Colorado clay loam and Spur clay loam.

All of this soil is used for range. The available water capacity is high. The soil is well drained, and surface

runoff is slow. Water erosion is a slight hazard, and soil blowing is a moderate hazard.

Most areas of this soil are subject to flooding every few years. The flooding is of short duration and does not severely damage crops or native vegetation. (Capability unit IIIe–4, dryland; Loamy Bottomland range site)

Stamford Series

The Stamford series consists of deep, nearly level to gently sloping, very slowly permeable, clayey soils. These soils developed in calcareous red clay and shale of Triassic and Permian red beds. They are on uplands.

In a representative profile the surface layer is reddish-brown clay about 7 inches thick. The next layer is reddish-brown clay about 29 inches thick. It has cracks at least 1 centimeter wide that extend to a depth of 20 inches at some time in most years. The underlying material, to a depth of 48 inches, consists of red clay.

Representative profile of Stamford clay, 1 to 3 percent slopes, in a pasture 0.1 mile south of the southeast corner of Lake J. B. Thomas:

A1—0 to 7 inches, reddish-brown (2.5YR 4/4) clay, dark reddish brown (2.5YR 3/4) moist; moderate, fine to medium, blocky structure; very hard, very firm, very sticky; few very fine pores; few root hairs; mildly alkaline; clear, smooth boundary.

AC—7 to 36 inches, reddish-brown (2.5YR 4/4) clay, dark reddish brown (2.5YR 3/4) moist; weak, medium, blocky structure to massive; very hard, very firm, very sticky; few masses of calcium carbonate in lower 8 inches; no visible pores; few, continuous, intersecting slickensides; calcareous; moderately alkaline; gradual, wavy boundary.

C—36 to 48 inches +, red (2.5YR 4/6) clay, dark red (2.5YR 3/6) moist; massive; weathered red-bed material; calcareous; moderately alkaline.

The A horizon ranges from 6 to 10 inches in thickness. The color ranges from reddish brown to dark reddish brown. The structure is weak to moderate, medium, blocky in areas where the soil is not massive.

The AC horizon ranges from 18 to 34 inches in thickness. The color ranges from red to dark reddish brown. In places segregated masses of calcium carbonate are as much as 10 percent, by volume, of the lower part and extend into the C horizon.

The depth to the C horizon ranges from 26 to 44 inches. The color ranges from red to light red.

Stamford clay, 0 to 1 percent slopes (StA).—This soil is on uplands. The areas are irregular in shape and range from 20 to 200 acres in size. The slope is mainly between 0.3 and 1 percent but averages about 0.7 percent.

The surface layer is reddish-brown clay about 9 inches thick. The next layer is reddish-brown clay about 31 inches thick. The underlying material is red, massive clay. Cracks at least 1 centimeter wide extend to a depth of 20 inches at some time in most years.

Included in mapping were small areas of Stamford clay, 1 to 3 percent slopes; Vernon clay; Olton clay loam; and Mangum clay.

Water erosion is a slight hazard. When the soil is dry, cracks 1 to 2 inches wide and as much as 24 inches deep are common.

Most areas of this soil are used for range. The available water capacity is high. The soil is well drained, and surface runoff is medium. (Capability unit IIIs–2, dryland; IIIs–1, irrigated; Clay Flat range site)

Stamford clay, 1 to 3 percent slopes (StB).—This soil is on uplands. The areas range from 40 to 300 acres in size. They are irregular and elongated in shape and parallel gently rolling ridges and drains. The slope is mainly between 1.3 and 2.8 percent.

This soil has the profile described as representative of the series.

Included in mapping were small areas of Olton clay loam, Vernon clay, and Weymouth clay loam.

Most areas of this soil are used for range. The available water capacity is high. The soil is well drained, and surface runoff is medium. When the soil is dry, cracks 1 to 2 inches wide and as much as 24 inches deep are common. Water erosion is a moderate hazard. A few shallow gullies, 6 to 15 inches deep and 2 to 6 feet wide, have formed. (Capability unit IVe–8, dryland; Clay Flat range site)

Tivoli Series

The Tivoli series consists of deep, rapidly permeable, sandy soils on uplands. These soils developed in eolian sands of the Quaternary period. They are characterized by undulating and duny topography.

In a representative profile the surface layer is pale-brown fine sand about 6 inches thick. The underlying material, to a depth of 84 inches, is light yellowish-brown fine sand.

Representative profile of Tivoli fine sand, in a pasture 0.25 mile south of Texas Highway 350, from a point 1.5 miles south of Ira:

A1—0 to 6 inches, pale-brown (10YR 6/3) fine sand, dark brown (10YR 4/3) moist; single grain; loose; many fibrous roots; mildly alkaline; clear, smooth boundary.

C—6 to 84 inches, light yellowish-brown (10YR 6/4) fine sand, yellowish brown (10YR 5/4) moist; color changes gradually to reddish yellow (7.5YR 6/6) at a depth below 38 inches; loose; common fibrous roots; mildly alkaline.

The A horizon ranges from 6 to 10 inches in thickness. The color ranges from pale brown to light yellowish brown.

The C horizon ranges from reddish yellow to brownish yellow in color.

Tivoli fine sand (Tv).—This soil is on broad, undulating to hummocky uplands. The slope ranges from 1 to 7 percent. The areas are irregular in shape and as much as several hundred acres in size.

Included in mapping were small areas of Brownfield fine sand.

This soil is suited to range. Permeability is rapid, and the available water capacity is low. Runoff is very slow, and the soil is excessively drained. Soil blowing is a severe hazard. (Capability unit VIIe–1; Deep Sand range site)

Veal Series

The Veal series consists of deep, gently sloping, friable, moderately permeable, calcareous soils. These soils are on uplands. They developed in calcareous, loamy sediments.

In a representative profile the surface layer is brown fine sandy loam about 7 inches thick. The next layer, about 11 inches thick, is light-brown sandy clay loam.

The underlying material, to a depth of 46 inches, is pink sandy clay loam that contains segregated calcium carbonate.

Representative profile of Veal fine sandy loam, 1 to 3 percent slopes, in a cultivated field 50 feet south of a county road, from a point 3.6 miles south on Texas Highway 208 from where it intersects U.S. Highway 84, and thence 1.4 miles east on county road:

Ap—0 to 7 inches, brown (7.5YR 5/4) fine sandy loam, dark brown (7.5YR 4/4) moist; weak granular structure; slightly hard, friable; few fine pores; calcareous; moderately alkaline; abrupt, smooth boundary.

B—7 to 18 inches, light-brown (7.5YR 6/4) sandy clay loam, brown (7.5YR 5/4) moist; weak, coarse, prismatic structure parting to weak subangular blocky; slightly hard, friable; few films and threads of calcium carbonate; few to common fine pores; calcareous; moderately alkaline; clear, wavy boundary.

C1ca—18 to 36 inches, pink (5YR 7/4) sandy clay loam, light reddish brown (5YR 6/4) moist; slightly hard, friable; many soft lumps and hard concretions of calcium carbonate that make up an estimated 30 percent, by volume, of the horizon; calcareous; moderately alkaline; gradual, wavy boundary.

C2—36 to 46 inches, pink (5YR 8/4) sandy clay loam, pink (5YR 7/4) moist; common soft lumps of calcium carbonate that make up an estimated 10 to 15 percent, by volume, of the horizon; calcareous; moderately alkaline.

The A horizon ranges from 5 to 8 inches in thickness. The color ranges from brown to pale brown.

The B horizon ranges from loam to sandy clay loam to clay loam in texture and from 6 to 13 inches in thickness. The color ranges from yellowish red to brown.

The depth to the C1ca horizon ranges from 11 to 20 inches. The texture ranges from sandy clay loam to clay loam. The color ranges from pink to white. Soft lumps and hard concretions of calcium carbonate make up 15 to 35 percent, by volume, of this horizon.

The depth to the C2 horizon ranges from 24 to 40 inches.

Veal fine sandy loam, 1 to 3 percent slopes (VaB).—The areas of this soil are convex. They range from 20 to 100 acres in size and are irregular in shape. The slope averages about 2 percent.

This soil has the profile described as representative of the series.

Included in mapping were small areas of Spade fine sandy loam; Veal fine sandy loam, 3 to 5 percent slopes; Potter soils; and a few areas of Miles and Cobb fine sandy loams.

This soil is used for both crops and range. The available water capacity is high. The soil is well drained, and surface runoff is medium. Soil blowing and water erosion are moderate hazards. Wind has removed some of the silt and clay of the plowed layer of most cultivated areas, leaving a sandier surface than when the soil was in grass. A few shallow gullies, 4 to 12 inches deep and 20 to 50 inches wide, have formed. (Capability unit IIIe–8, dryland; IIIe–7, irrigated; Sandy Loam range site)

Veal fine sandy loam, 3 to 5 percent slopes (VaC).—This soil is in convex areas, mostly along the side slopes of drainageways and on sloping ridges within areas of the deeper upland soils. The slope averages about 4 percent. The areas range from 10 to 90 acres in size and are elongated to irregular in shape.

The surface layer is brown fine sandy loam about 6 inches thick. The next layer is light-brown sandy clay loam about 9 inches thick. The underlying material is pinkish, calcareous sandy clay loam.

Included in mapping were small areas of Potter soils; Spade fine sandy loam; Veal fine sandy loam, 1 to 3 percent slopes; and Miles and Cobb fine sandy loams.

This soil is used for both crops and range. The available water capacity is high. The soil is well drained, and surface runoff is medium. Soil blowing is a moderate hazard, and water erosion is a severe hazard. Wind has removed some of the silt and clay of the plow layer in most cultivated areas, leaving a sandier surface than when the soil was in grass. In cultivated areas a few shallow gullies, 6 to 20 inches deep and 20 to 70 inches wide, have formed. (Capability unit IVe–5, dryland; IVe–5, irrigated; Sandy Loam range site)

Vernon Series

The Vernon series consists of deep, gently sloping to steep, calcareous, slowly permeable soils. These soils are on uplands. They developed in calcareous Triassic or Permian red-bed clays and shales.

In a representative profile the surface layer is reddish-brown clay about 6 inches thick. The next layer is reddish-brown clay about 10 inches thick. The underlying material, to a depth of 48 inches, is reddish-brown red-bed clay.

Representative profile of Vernon clay, 1 to 3 percent slopes, in a pasture 0.67 mile south of Farm Road 1610, from a point 2.3 miles west of the Knapp Community Center:

A1—0 to 6 inches, reddish-brown (2.5YR 4/4) clay, dark reddish brown (2.5YR 3/4) moist; moderate, fine to medium, blocky structure; very hard, very firm, very sticky; few very fine root hairs; calcareous; moderately alkaline; gradual, smooth boundary.

B—6 to 16 inches, reddish-brown (2.5YR 4/4) clay, dark reddish brown (2.5YR 3/4) moist; moderate, medium, blocky structure that approaches massive when wet; very hard, very firm, very sticky; few, fine, hard calcium carbonate concretions; few very fine root hairs; calcareous; moderately alkaline; clear, wavy boundary.

C—16 to 48 inches +, reddish-brown (2.5YR 4/4) red-bed clay, dark red (2.5YR 3/6) moist; massive; calcareous; moderately alkaline.

The A horizon ranges from 6 to 10 inches in thickness and from red to reddish brown in color. The texture ranges from clay loam to clay.

The B horizon ranges from 8 to 14 inches in thickness and from reddish brown to red in color. The texture ranges from clay loam to clay.

The depth to the C horizon ranges from 14 to 26 inches. The color ranges from red to dark reddish brown.

Vernon clay, 1 to 3 percent slopes (VcB).—This soil is on uplands along the side slopes of drainageways on narrow ridges and hilltops within areas of the deeper upland soils. The slope averages about 2 percent. The areas are irregular to oblong in shape and range from 20 to 120 acres in size.

This soil has the profile described as representative of the series.

Included in mapping were small areas of Stamford clay; Weymouth clay loam; Vernon clay loam; and Vernon clay, 3 to 5 percent slopes.

This soil is used mostly for range. The available water capacity is high. The soil is well drained, and surface runoff is rapid. Water erosion is a moderate hazard. One to three inches of topsoil has been removed by sheet erosion in some cultivated fields. A few shallow gullies, 4 to 10 inches deep and 1 to 4 feet wide, have formed. (Capability unit IVe–7, dryland; Shallow Redland range site)

Vernon clay, 3 to 5 percent slopes (VcC).—This soil is on uplands, mostly along the side slopes of drainageways and ridges within areas of the deeper upland soils. The slope averages about 4 percent. The areas are elongated to irregular in shape and range from 20 to 100 acres in size.

The surface layer is reddish-brown clay about 6 inches thick. The next layer is red clay about 8 inches thick. The underlying material is massive red-bed clay.

Included in mapping were small areas of Weymouth clay loam; Vernon clay loam; Stamford clay; and Vernon clay, 1 to 3 percent slopes.

This soil is used for range. The available water capacity is high. The soil is well drained, and surface runoff is rapid. Water erosion is a severe hazard. A few small U-shaped gullies, 6 to 18 inches deep and 1 to 4 feet wide, have formed. (Capability unit VIe–1, dryland; Shallow Redland range site)

Vernon-Badland complex (Vd).—This complex consists of gently sloping to sloping Vernon clay and areas of eroded, clayey red beds. It occupies areas along drainageways and intermittent streams. The slope is between 2 and 30 percent. The areas range from twenty to several hundred acres in size and are irregular in shape.

The Vernon component has a reddish-brown clay surface layer about 6 inches thick. The next layer is reddish-brown clay about 8 inches thick. The underlying material is massive, red-bed clay. The Badland component consists of red Triassic and Permian red-bed clays that have been eroded.

The composition of this complex averages about 35 percent Vernon clay and 29 percent Badland. The remaining 36 percent consists of small areas of Stamford clay; Vernon clay loam; Latom soils; and a reddish, calcareous clay and clay loam soil about 4 to 10 inches thick over partly weathered, calcareous, red-bed clays. The Vernon clay component ranges from 22 to 45 percent of the complex, and the Badland component from 15 to 44 percent.

The slope of the Vernon clay component averages about 2 to 4 percent. The Badland component occurs as eroded areas. The slope ranges from 2 to 30 percent.

Water erosion is a moderate to severe hazard on the Vernon component. Shallow gullies have formed in some areas. Erosion on the Badland component is mainly geologic and is active. Soil is lost through erosion about as fast as it is formed.

This complex is not suitable for cultivation. It is used for range. About 5 to 15 percent bare ground is exposed in the areas of Vernon clay. The Badland component is 75 to 95 percent bare ground and supports only sparse growth of vegetation. (Capability unit VIIs–2, dryland; Shallow Redland range site)

Vernon-Potter complex (Vp).—This complex consists of areas of gently sloping to steep Vernon clay and gently sloping to sloping Potter soils. The areas range from 20 to 1,000 acres in size and are oval to irregular in shape. The slope is between 2 and 30 percent.

The Vernon component has a reddish-brown clay surface layer about 7 inches thick. The next layer is reddish-brown clay about 10 inches thick. The underlying material is massive red-bed clays.

The Potter component has a surface layer of pale-brown, calcareous fine sandy loam to clay loam about 6 inches thick. This layer contains many caliche pebbles and some fine gravel. It rests directly on beds of soft to slightly hard, white and pink caliche. The caliche beds are 1 to 5 feet thick and rest directly on clayey red-bed materials.

The composition of this complex averages about 44 percent Vernon clay and 36 percent Potter soils. The remaining 20 percent consists of small areas of Colorado and Spur soils, Mansker loam, Vernon clay loam, Badland, and reddish, calcareous clay and clay loam soil about 4 to 10 inches thick that overlies partly weathered, calcareous, red-bed clays.

Potter soils occupy scarp and hilltop positions. The hilltops are approximately 50 to 800 feet wide. Vernon clay occupies side slopes below Potter soils. Caliche rocks or fragments and gravel from the higher lying Potter soils have moved downslope and have been deposited on the surface of the Vernon soil in some places.

Water erosion is a moderate to severe hazard. A few shallow gullies, 1 to 2 feet deep and 2 to 4 feet wide, have formed along some of the intermittent drainageways.

This complex is not suitable for cultivation. It is used for range. (Capability unit VIe–2; Shallow Redland range site)

Weymouth Series

The Weymouth series consists of calcareous, deep, gently sloping, moderately permeable soils. These soils developed in strongly calcareous, weakly consolidated sediments of Triassic or Permian age. Weymouth soils are on uplands.

In a representative profile the surface layer is reddish-brown clay loam about 9 inches thick. The next layer is reddish-brown clay loam in the upper 10 inches and reddish-yellow clay loam in the lower 23 inches. About 15 to 25 percent, by volume, of this layer is soft masses of calcium carbonate. The underlying material, to a depth of 56 inches, is reddish-brown clay loam.

This soil is well drained, and runoff is medium. The available water capacity is high.

Representative profile of Weymouth clay loam, in an area of Weymouth-Vernon clay loams, 1 to 3 percent slopes, in a pasture 75 feet east of a county road, from a point 3.0 miles south on Farm Road 1604 from where it intersects U.S. Highway 180, and thence 0.7 mile south on county road:

A1—0 to 9 inches, reddish-brown (5YR 4/4) clay loam, dark reddish brown (5YR 3/4) moist; weak subangular blocky structure; hard, friable; few very fine roots; few, fine, hard, calcium carbonate concretions on surface; calcareous; moderately alkaline; clear, smooth boundary.

B2—9 to 19 inches, reddish-brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) moist; weak to moderate, fine, subangular blocky structure; very hard, friable, sticky; few, fine, hard, calcium carbonate concretions; few very fine pores; calcareous; moderately alkaline; clear, wavy boundary.

B3ca—19 to 42 inches, reddish-yellow (5YR 6/6) clay loam, yellowish red (5YR 5/6) moist; color changes gradually to pink (5YR 7/4) as depth increases; weak subangular blocky structure; hard, friable; common to many hard concretions and soft masses of calcium carbonate make up about 15 to 25 percent, by volume, of this horizon; calcareous; moderately alkaline; gradual, wavy boundary.

C—42 to 56 inches +, reddish-brown (2.5YR 5/4) clay loam, reddish brown (2.5YR 4/4) moist; massive; red-bed material.

The A horizon ranges from 6 to 10 inches in thickness. The color ranges from brown to reddish brown.

The B2 horizon ranges from brown to light reddish brown in color. It ranges from 6 to 15 inches in thickness.

The B3ca horizon ranges from 12 to 25 inches in thickness. The color ranges from reddish yellow to pink to red.

The depth to the C horizon ranges from 26 to 55 inches. The color ranges from red to reddish brown.

Weymouth-Vernon clay loams, 1 to 3 percent slopes (WvB).—This complex occupies narrow ridges within the deeper upland soils and along the side slopes of drainageways. The slope averages about 2.3 percent. The areas are oblong to irregular in shape and range from 20 to 50 acres in size.

The Weymouth component has the profile described as representative of the Weymouth series. The Vernon component has a reddish-brown surface layer about 6 inches thick. The next layer is reddish-brown clay about 14 inches thick. The underlying material is massive red-bed clay.

The Weymouth soil occupies the tops of ridges, and the Vernon soil occupies the sides of ridges. Weymouth clay loam makes up about 55 percent of this complex, and Vernon clay loam makes up about 44 percent.

Included in mapping were small areas of Vernon clay, Mansker loam, Olton clay loam, and areas of this complex where the slope is 3 to 5 percent.

These soils are used for both range and crops. Soil blowing is a slight hazard, and water erosion is a moderate hazard. (Capability unit IVe–7, dryland; Shallow Redland range site)

Weymouth-Vernon clay loams, 3 to 5 percent slopes (WvC).—This complex occupies the side slopes of drainageways and narrow ridges within areas of deeper upland soils. The slope averages about 4 percent. The areas are oblong and range from 20 to 40 acres in size.

The Weymouth component has a reddish-brown surface layer about 7 inches thick. The next layer is reddish-brown clay loam about 8 inches thick. The next lower layer is reddish-yellow clay loam about 20 inches thick. The underlying material, to a depth of 50 inches, is reddish-brown clay loam.

The Vernon component has a reddish-brown surface layer about 6 inches thick. The next layer is reddish-brown clay about 11 inches thick. The underlying material is massive red clay.

The Weymouth component occupies the tops of the ridges, and the Vernon component occupies the sides. Weymouth clay loam makes up about 51 percent of this complex, and Vernon clay loam, about 49 percent. Included in mapping were small areas of Vernon clay; Weymouth-Vernon clay loams, 1 to 3 percent slopes; and Mansker loam.

This complex is used mostly for range. A few small areas are cultivated. Water erosion is a severe hazard. A few gullies, 6 to 12 inches deep and 1 to 3 feet wide, have formed where runoff water concentrates. (Capability unit VIe–1, dryland; Shallow Redland range site)

Woodward Series

The Woodward series consists of moderately deep, moderately permeable soils on uplands. These soils developed in soft, calcareous, sandstone red beds of the Permian period.

In a representative profile the surface layer is reddish-brown loam about 9 inches thick. The next layer is yellowish-red loam in the upper 9 inches and, in the lower 8 inches, reddish-yellow loam that contains many hard and soft calcium carbonate concretions. The underlying material, to a depth of 46 inches, is yellowish-red, calcareous, weakly consolidated sandstone.

Representative profile of Woodward loam, 1 to 3 percent slopes, in a pasture 0.6 mile south of a county road, from a point 8.5 miles east of Snyder, on Farm Road 1614, 6.0 miles north, 4.0 miles east, 2.6 miles north, 1.0 mile east, 0.5 mile north, 1.5 miles east, 1.0 mile south, and 0.5 mile east on county road:

A1—0 to 9 inches, reddish-brown (5YR 5/4) loam, dark reddish brown (5YR 3/4) moist; weak subangular blocky structure; slightly hard, friable; many very fine pores; many very fine root hairs; mildly alkaline; clear, smooth boundary.

B2—9 to 18 inches, yellowish-red (5YR 5/6) loam, yellowish red (5YR 4/6) moist; weak, coarse, prismatic structure parting to weak, fine to medium, subangular blocky; hard, friable; common threads and films of calcium carbonate; many very fine pores; mildly alkaline; gradual, wavy boundary.

B3ca—18 to 26 inches, reddish-yellow (5YR 6/6) loam, yellowish red (5YR 5/6) moist; hard, friable; many, hard, fine to medium concretions and soft lumps of calcium carbonate; calcareous; moderately alkaline; clear lower boundary.

R—26 to 46 inches +, yellowish-red (5YR 5/6) specked with blue, calcareous, sandstone red beds that are weakly consolidated.

The A horizon ranges from 8 to 12 inches in thickness. The color ranges from reddish brown to reddish yellow.

The B2 horizon ranges from loam to very fine sandy loam in texture and from 8 to 12 inches in thickness. The color ranges from reddish brown to yellowish red. The structure is weak, medium to coarse, prismatic and weak, subangular blocky.

The B3ca horizon ranges from 4 to 16 inches in thickness. The color ranges from red to reddish yellow. Soft lumps and hard concretions of calcium carbonate make up 10 to 80 percent, by volume, of this horizon.

The depth to the R layer ranges from 20 to 40 inches.

Woodward loam, 1 to 3 percent slopes (WwB).—This soil is on uplands. The areas are oblong and irregular in shape and range from 20 to 100 acres in size. The slope is mainly between 1.5 and 3.0 percent but is dominantly about 2 percent.

Included in mapping were small areas of Quinlan loam and Carey loam.

Most of this soil is in range. Soil blowing is a slight hazard, and water erosion is a moderate hazard. The

available water capacity is low. This soil is well drained, and surface runoff is medium. (Capability unit IIe–1, dryland; Mixedland range site)

Use and Management of the Soils

This section explains the capability classification in which the soils are grouped according to their suitability for most kinds of farming and discusses the management of the soils by capability units. It gives a brief description of irrigation in the county and gives estimates of crop yields under a high level of management. This section also discusses range management, use of the soils for wildlife, and engineering uses of the soils.

Capability Grouping of Cropland

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The soils are grouped according to their limitations when used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops requiring special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for range, for forest trees, or for engineering.

In the capability system, the kinds of soil are grouped at three levels: the capability class, the subclass, and the unit. These are discussed in the following paragraphs.

Capability Classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Class V soils are subject to little or no erosion but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife habitat.

Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife habitat.

Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland, or wildlife habitat.

Class VIII soils and landforms have limitations that preclude their use for commercial plant production and restrict their use to areas of recreation, wildlife habitat, or water supply, or to esthetic purposes. (None in this county)

Capability Subclasses are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range, woodland, wildlife habitat, or recreation.

Capability Units are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe–4 or IIIe–6. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit within each subclass.

Management by capability units [1]

In the following pages the capability units of Scurry County are described, and suggestions for the use and management of the soils are given. To find the names of the soils in any given unit, refer to the "Guide to Mapping Units."

CAPABILITY UNIT I–1, IRRIGATED

This unit consists of deep, nearly level, moderately slowly permeable, loamy soils on uplands. These soils are well drained, and surface runoff is slow. The hazard of water erosion is slight. The available water capacity is high.

Most areas of these soils are cultivated and are suitable for intensive farming. Cotton, small grains, and grain sorghum are the principal crops.

Conserving moisture and maintaining tilth and fertility are the main management objectives. A good irrigation system and proper application of irrigation water

[1] By George K. Desha, conservation agronomist, Soil Conservation Service, Big Spring.

are needed (fig. 10). Large amounts of crop residue are needed to maintain tilth. Applications of commercial fertilizer are needed for most crops.

CAPABILITY UNIT I-2, IRRIGATED

Spur clay loam is the only soil in this unit. This is a deep, nearly level, moderately permeable, loamy soil on bottom lands. It is well drained, and surface runoff is slow. Soil blowing is a slight hazard. The available water capacity is high.

Cotton, grain sorghum, and wheat are the principal crops.

Conserving moisture and maintaining tilth and fertility are the main management objectives. A good irrigation system and proper application of irrigation water are needed. A cropping system that includes such crops as grain sorghum and wheat, which return large amounts of residue to the soil, helps to maintain tilth. Emergency tillage and mulching the crop residue on the soil surface during critical periods of erosion help to control erosion if there is not enough crop residue. Applications of commercial fertilizer are needed for most crops.

CAPABILITY UNIT IIe-1, DRYLAND

This unit consists of deep to moderately deep, gently sloping, moderately permeable soils that have a surface layer of loam. Soil blowing is a slight hazard. Water erosion is a moderate hazard. The available water capacity is low to high.

These soils are suitable for intensive cultivation if they are protected from erosion. Cotton, grain sorghum, and wheat are the main crops.

Controlling erosion and conserving moisture are the main management objectives. Terracing and contour farming are needed in the more sloping areas. Cropping systems that include such crops as small grains and sorghums, which return large amounts of residue to the soil, are suitable. If managed on the surface, the residue from these crops provides effective erosion control during the critical period. Tilling the soil to roughen the surface also helps to retard soil blowing. In areas where runoff concentrates, grassed waterways help to prevent gullying.

CAPABILITY UNIT IIe-1, IRRIGATED

This unit consists of deep, gently sloping, moderately slowly permeable, loamy soils on uplands. These soils are well drained, and surface runoff is medium. Water erosion is a moderate hazard. The available water capacity is high.

Most areas of these soils are cultivated. If protected from erosion, these soils are suitable for most kinds of farming. Cotton, grain sorghum, and small grain are the main crops.

Controlling erosion and conserving moisture are the main management objectives. A good irrigation system and proper application of irrigation water are needed. Cropping systems that include such crops as small grains and grain sorghums, which return large amounts of residue to the soil, are needed. The residue from these crops provides effective erosion control when it is mulched on the surface during critical periods. Tilling the soil to roughen the surface helps to retard soil blowing. Grassed waterways help to control gullying in areas where runoff concentrates.

CAPABILITY UNIT IIe-4, IRRIGATED

Miles fine sandy loam, 0 to 1 percent slopes, is the only soil in this unit. This is a deep, well-drained, nearly level, moderately permeable, loamy soil on uplands. Water erosion is a slight hazard. Soil blowing is a moderate hazard. The available water capacity is high.

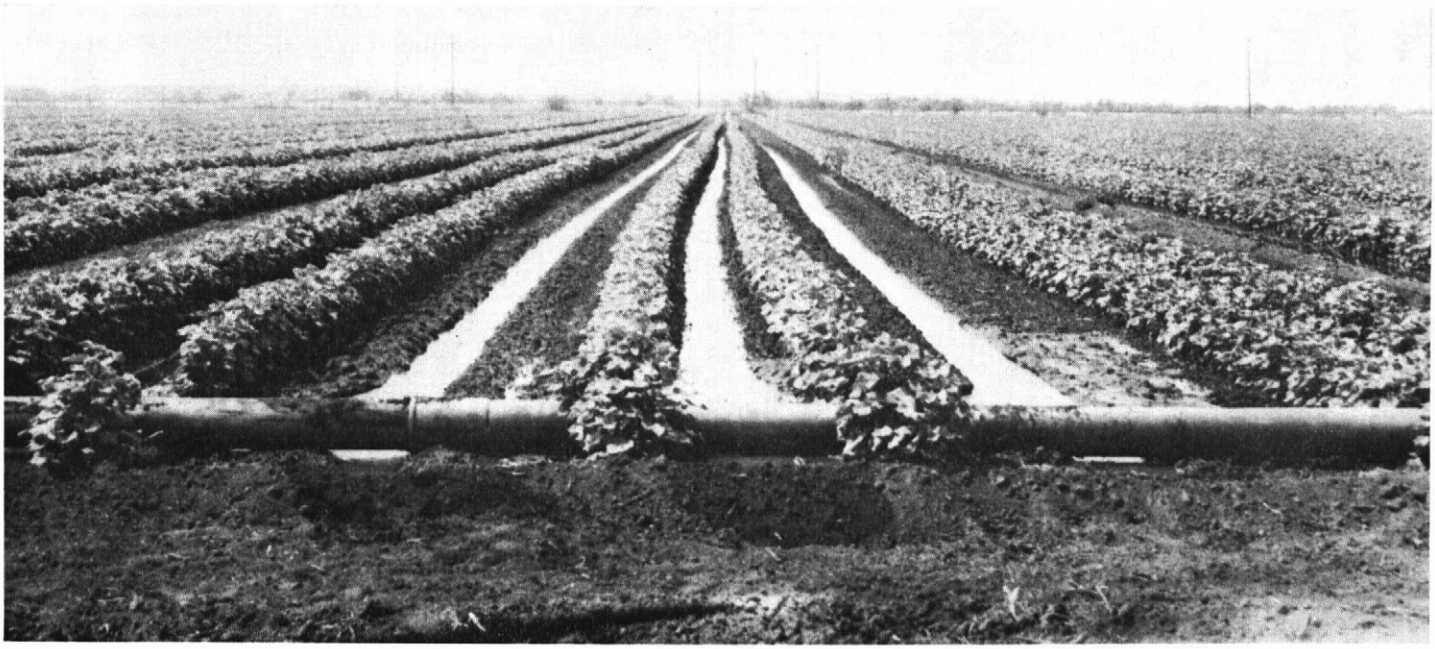

Figure 10.—Row irrigation on Olton clay loam.

Most areas of this soil are cultivated and, if protected from erosion, are suitable for most kinds of farming. Cotton, grain sorghum, and small grain are the principal crops. Such crops as alfalfa, forage sorghum, and winter legumes are also suitable.

Conserving moisture, controlling erosion, and maintaining tilth and fertility are the main management objectives. A good irrigation system and proper application of irrigation water are needed. A cropping system that includes such crops as sorghums and small grain returns large amounts of residue to the soil and helps to control erosion and to maintain tilth.

CAPABILITY UNIT IIe–5, IRRIGATED

This unit consists of Miles and Cobb fine sandy loams, 1 to 3 percent slopes. These are moderately deep and deep, gently sloping, well-drained, moderately permeable, loamy soils on uplands. Water erosion and soil blowing are moderate hazards. The available water capacity is high.

Most areas of these soils are cultivated and, if protected from erosion, are suitable for most kinds of farming. Cotton, grain sorghum, and small grain are the principal crops. Such crops as alfalfa, forage sorghum, and winter legumes are also suitable.

The main management objectives are conserving moisture, controlling erosion, and maintaining tilth and fertility. A good irrigation system and proper application of irrigation water are needed. A cropping system that includes such crops as sorghums and small grain, which return large amounts of residue to the soil, helps to control erosion and to maintain tilth.

CAPABILITY UNIT IIce–1, DRYLAND

Spur clay loam is the only soil in this unit. This is a deep, nearly level, moderately permeable, loamy soil on bottom lands. It is well drained, and surface runoff is slow. Soil blowing is a slight hazard. The available water capacity is high.

Cotton, grain sorghum, and wheat are the main crops.

The main management objectives are conserving moisture and controlling erosion. Contour farming helps to conserve moisture. A cropping system that includes such crops as grain sorghum and wheat, which return large amounts of residue to the soil, is suitable. Managing the crop residue on the surface during critical periods of erosion helps to control erosion. If there is not enough crop residue to control erosion, emergency tillage to roughen the surface helps to control erosion.

CAPABILITY UNIT IIce–4, DRYLAND

This unit consists of deep, nearly level, moderately slowly permeable, loamy soils on uplands. These soils are well drained, and surface runoff is slow. Water erosion is a slight hazard. The available water capacity is high.

Most areas of these soils are cultivated and are suitable for intensive farming. Cotton, small grains, and grain sorghum are the principal crops.

The main management objectives are conserving moisture and controlling erosion. A cropping system consisting of such crops as sorghum and small grain, which return large amounts of residue to the soil, is needed. Keeping crop residue on the surface helps to conserve moisture and to control soil blowing. Terracing and contour farming help to conserve moisture.

CAPABILITY UNIT IIIe–2, DRYLAND

This unit consists of deep, gently sloping, moderately slowly permeable, loamy soils on uplands. These soils are well drained, and surface runoff is medium. Water erosion is a moderate hazard. The available water capacity is high.

These soils are suitable for most kinds of farming if they are protected from erosion. Cotton, grain sorghum, and small grain are the main crops.

Controlling erosion and conserving moisture are the main management objectives. Terracing and contour farming control loss of soil and water. Cropping systems should include crops that return large amounts of residue, such as small grain and grain sorghum. The residue from these crops provides effective erosion control if it is mulched on the surface during critical periods of erosion. Tilling the soil to roughen the surface helps to retard soil blowing. Grassed waterways help to control gullying in areas where runoff concentrates.

CAPABILITY UNIT IIIe–3, IRRIGATED

This unit consists of Miles and Cobb fine sandy loams, 3 to 5 percent slopes. These are moderately deep and deep, gently sloping, moderately permeable, loamy soils on uplands. Soil blowing and water erosion are moderate hazards. The available water capacity is high.

These soils are suitable for limited farming because of the erosion hazard. The main crops are small grain and forage sorghum.

Controlling erosion and conserving moisture are the main management objectives. An effective irrigation system and proper management of irrigation water are needed. Closely spaced high-residue crops, such as small grain and sudangrass, provide effective erosion control. Residue from these crops managed on the surface until after the next crop is planted provides the most effective control. If crop residue is lacking during the critical period of erosion, tilling the soil to roughen the surface helps to retard erosion. Grassed waterways help to control gullying in areas where water concentrates.

CAPABILITY UNIT IIIe–4, DRYLAND

This unit consists of moderately deep and deep, well-drained, nearly level and gently sloping, moderately permeable, loamy soils. Water erosion is a slight to moderate hazard. Soil blowing is a moderate hazard. The available water capacity is high.

Most areas of these soils are cultivated and, if protected from erosion, are suitable for most kinds of farming. Cotton, grain sorghum, and small grain are the principal crops.

Controlling erosion and conserving moisture are the main management objectives. Terracing and contour farming help to control loss of soil erosion and water. A cropping system that includes high-residue crops, such as sorghums and small grains, produces large amounts of residue. The residue from these crops provides effective erosion control if it is managed on the surface dur-

ing critical periods. If residue is lacking, tillage to roughen the surface helps to retard soil blowing.

CAPABILITY UNIT IIIe–6, DRYLAND

Mansker loam, 0 to 1 percent slopes, is the only soil in this unit. This is a deep, nearly level, calcareous, moderately permeable, loamy soil on uplands. Soil blowing is a slight hazard. This soil is well drained, and surface runoff is medium. The available water capacity is high.

Most areas of this soil are cultivated and are suitable for most kinds of farming. Cotton, wheat, and grain sorghum are the main crops. Oats, barley, and forage sorghum are also grown.

Conserving moisture and controlling erosion are the main management objectives. Cropping systems that include such crops as small grain and sorghum, which return large amounts of residue, are needed. If managed on the surface during the critical period of erosion, this residue helps to control erosion. Terracing and contour farming help to conserve moisture. If crop residue is lacking, emergency tillage to roughen the soil surface helps to control soil blowing.

CAPABILITY UNIT IIIe–6, IRRIGATED

Miles loamy fine sand, 0 to 3 percent slopes, is the only soil in this unit. This is a deep, nearly level to gently sloping, undulating, moderately permeable, sandy soil on uplands. Soil blowing is a moderate to severe hazard. Water erosion is a slight hazard. This soil is well drained, and surface runoff is very slow. The available water capacity is moderate.

The main crops are grain sorghum, cotton, and small grain.

Controlling erosion is the main management objective. Conserving moisture is also important. A good irrigation system and proper management of irrigation water are needed. A cropping system that includes such crops as grain sorghum and small grain is needed. Residue from sorghum and small grain managed on the surface during critical periods of erosion helps to control soil blowing. Applications of commercial fertilizer are needed for most crops.

CAPABILITY UNIT IIIe–7, DRYLAND

This unit consists of deep, gently sloping, moderately permeable, loamy soils on uplands. These soils are well drained, and surface runoff is medium. Water erosion is a moderate hazard. The available water capacity is high.

These soils are suitable for cultivation, but most of the acreage is used as range. Cotton, sorghum, and small grain are the main crops.

The management objectives in cultivated areas are controlling erosion and conserving moisture. A cropping system that includes high-residue crops, such as sorghum or small grain, is suitable. Crop residue left on the surface during the critical periods of erosion helps to reduce loss of soil and water. Terracing and contour farming help to control loss of soil and water. If crop residues are inadequate, tillage to roughen the soil surface helps to control soil blowing.

CAPABILITY UNIT IIIe–7, IRRIGATED

This unit consists of deep, gently sloping, moderately permeable, loamy soils on uplands. Water erosion is a moderate hazard. Soil blowing is a slight to moderate hazard. These soils are well drained, and surface runoff is medium. The available water capacity is high.

Cotton, grain sorghum, and small grain are the principal crops.

Controlling erosion, conserving moisture, and maintaining soil tilth and productivity are the main management objectives. A good irrigation system and proper management of irrigation water are needed. Terracing and contour farming help to control loss of soil and water. Large amounts of crop residue are needed to keep the soil in good tilth. Applications of commercial fertilizer are needed for most crops.

CAPABILITY UNIT IIIe–8, DRYLAND

Veal fine sandy loam, 1 to 3 percent slopes, is the only soil in this unit. This is a deep, gently sloping, moderately permeable, loamy soil on uplands. Water erosion and soil blowing are moderate hazards. This soil is well drained, and runoff is medium. The available water capacity is high.

Most areas of this soil are cultivated and are suitable for farming if protected from erosion. Cotton, grain sorghum, and small grain are the principal crops.

Controlling erosion and conserving moisture are the main management objectives. Terracing, contour farming, and cropping systems that include high-residue crops, such as grain sorghum and small grains, are needed. If managed on the surface during the critical period of erosion, the residue from these crops provides effective erosion control. If residue is lacking, emergency tillage to roughen the soil surface helps to retard soil blowing. Grassed waterways are needed in areas where runoff water concentrates.

CAPABILITY UNIT IIIs–1, IRRIGATED

Stamford clay, 0 to 1 percent slopes, is the only soil in this unit. This is a deep, nearly level, very slowly permeable, clayey soil on uplands. Water erosion is a slight hazard. This soil is well drained, and surface runoff is medium. The available water capacity is high.

The principal crops are grain sorghum and forage sorghum.

The main management objectives are conserving moisture and maintaining tilth and fertility. A good irrigation system and proper management of irrigation water are needed. Large amounts of crop residue are needed to keep the soil in good tilth. Applications of commercial fertilizer are needed for most crops.

CAPABILITY UNIT IIIs–2, DRYLAND

Stamford clay, 0 to 1 percent slopes, is the only soil in this unit. It is a deep, nearly level, very slowly permeable, clayey soil on uplands. This soil is well drained, and surface runoff is medium. The hazard of water erosion is slight. The available water capacity is high.

Most areas of this soil are in native range. A few areas are cultivated. Small grains, forage sorghum, and grain sorghum are the principal crops.

The main management objectives are to conserve moisture and to maintain soil productivity and tilth. Cropping systems that include grain sorghum or other crops that produce a large amount of residue are suitable. If

the residue is kept on the surface, it helps to conserve moisture and to improve tilth. Terracing and contour farming in the more sloping areas help to control loss of water.

CAPABILITY UNIT IIIs–2, IRRIGATED

Mansker loam, 0 to 1 percent slopes, is the only soil in this unit. This is a deep, nearly level, moderately permeable, loamy soil on uplands. Soil blowing is a slight hazard. This soil is well drained, and surface runoff is medium. The available water capacity is high.

Cotton, wheat, and grain sorghum are the main crops. Oats, barley, and forage sorghum are also grown. Such crops as alfalfa and annual legumes can also be grown.

The main management objectives are conserving moisture and maintaining tilth and productivity. A good irrigation system and proper management of irrigation water are needed. Large amounts of crop residue are needed to keep the soil in good tilth. Applications of commercial fertilizer are needed for most crops.

CAPABILITY UNIT IIIw–1, DRYLAND

Roscoe clay is the only soil in this unit. This is a deep, nearly level, very slowly permeable, clayey soil on uplands. Soil blowing is a slight hazard. This soil is moderately well drained, and surface runoff is very slow. The available water capacity is high.

This soil is suitable for cultivation. Winter small grains are the main crops, but cotton and grain sorghum are also grown.

Keeping the soil open and in good tilth is the main concern of management. Water stands in the fields after heavy rains and makes cultivation difficult. The soil is cloddy and hard if dry. A cropping system that includes such crops as small grain and sorghum, which produce large amounts of residue, is needed. Managing the residue on the surface helps to prevent crusting and improves tilth. Emergency tillage to roughen the surface is effective in controlling soil blowing. Deep tillage with chisels helps to open up the soil so that rainfall can penetrate more rapidly and encourages deeper penetration of roots.

CAPABILITY UNIT IVe–2, DRYLAND

Mansker loam, 3 to 5 percent slopes, is the only soil in this unit. This is a deep, gently sloping, moderately permeable, loamy soil on uplands. Water erosion is a severe hazard. This soil is well drained, and surface runoff is rapid. The available water capacity is high.

Most areas of this soil are in native grass. A few areas are cultivated. Sorghums and small grains are the main crops.

The main management objectives are controlling erosion and conserving moisture. Crops that produce large amounts of residue are needed in the cropping system. If managed on the surface, the residue helps to control erosion. Contour farming in combination with terracing is needed to control water erosion and to conserve moisture.

CAPABILITY UNIT IVe–4, DRYLAND

This unit consists of Miles and Cobb fine sandy loams, 3 to 5 percent slopes. The soils are deep and moderately deep, gently sloping, moderately permeable, and loamy. They are on uplands. Soil blowing and water erosion are moderate hazards. The available water capacity is high.

Most areas of these soils are cultivated. The soils are suitable for only limited farming, due to the hazards of erosion. The main crops are small grain and forage sorghum.

Controlling erosion and conserving moisture are the main management objectives. Terraces and a cropping system that includes drilled high-residue crops, such as small grain and sudangrass, are desirable. Residue from these crops managed on the surface until after the next crop is planted provides the most effective erosion control. If residue is lacking during the critical period of erosion, tillage to roughen the surface helps to retard erosion. Grassed waterways are needed to prevent gullying in areas where water concentrates.

CAPABILITY UNIT IVe–5, DRYLAND

This unit consists of very shallow to deep, gently sloping, moderately permeable, loamy soils on uplands. Soil blowing and water erosion are moderate hazards. The soils are well drained, and surface runoff is medium. The available water capacity is low to high.

These soils are suitable for only limited cultivation. Sorghum and small grain are the main crops. Most areas are in native range.

The main management objectives in cultivated areas are controlling erosion and conserving moisture. If managed on the surface, crop residue helps to reduce the hazard of erosion. In areas where crop residues are not sufficient to control soil blowing, chiseling or listing as emergency tillage is helpful. Terracing and contour farming help to reduce loss of soil and water.

CAPABILITY UNIT IVe–5, IRRIGATED

This unit consists of deep, gently sloping, moderately permeable, loamy soils on uplands. Soil blowing is a slight to moderate hazard, and water erosion is a moderate hazard. The soils are well drained, and surface runoff is medium to rapid. The available water capacity is high.

These soils are suitable for only limited cultivation. Sorghum and small grain are the main crops.

The main objectives in cultivated areas are controlling erosion and conserving moisture. Crop residue left on the surface helps to reduce the hazard of erosion. Terracing and contour farming help to reduce loss of soil and water. A good irrigation system and proper management of irrigation water are needed. Applications of commercial fertilizer are needed for most crops.

CAPABILITY UNIT IVe–6, DRYLAND

Miles loamy fine sand, 0 to 3 percent slopes, is the only soil in this unit. This is a deep, nearly level to gently sloping, undulating, moderately permeable, sandy soil on uplands. Soil blowing is a moderate to severe hazard, and water erosion is a slight hazard. This soil is well drained, and surface runoff is very slow. The available water capacity is moderate.

Most areas of this soil are farmed and are suitable for limited cultivation if protected from erosion. Grain sorghum, cotton, and small grain are the main crops.

Controlling erosion is the main management requirement. Conserving moisture is also necessary. Residue-producing crops are needed. Cotton can be grown safely

only when planted in strips alternating with strips of high-residue crops. Large amounts of residue from sorghum and small grain managed on the surface during critical periods of erosion help to control soil blowing. If there is not enough crop residue to control soil blowing, chiseling or listing as emergency tillage is helpful.

CAPABILITY UNIT IVe–7, DRYLAND

This unit consists of deep, gently sloping, moderately and slowly permeable, loamy and clayey soils on uplands. Water erosion is a moderate hazard. These soils are well drained, and surface runoff is medium. The available water capacity is high.

Most areas of these soils are in native range. A few areas are cultivated to small grain and sorghums.

In cultivated areas, the main management objectives are to control erosion and to conserve moisture. Cropping systems that include crops that produce large amounts of residue are desirable. Contour farming in combination with terracing helps to control erosion and to conserve moisture.

CAPABILITY UNIT IVe–8, DRYLAND

Stamford clay, 1 to 3 percent slopes, is the only soil in this unit. This is a deep, gently sloping, very slowly permeable, clayey soil on uplands. Water erosion is a moderate hazard. This soil is well drained, and surface runoff is medium. The available water capacity is high.

Most areas of this soil are in native range. In cultivated areas, high-residue crops, such as sorghum and small grain, are the main crops.

The main management requirements in cultivated areas are controlling erosion and conserving moisture. If managed on the surface, crop residue is effective in controlling erosion and conserving moisture. Terracing and contour farming help in this control.

CAPABILITY UNIT IVe–9, DRYLAND

This unit consists of the Lea-Kimbrough-Slaughter complex. Soils of this complex are very shallow to moderately deep, gently sloping, moderately and moderately slowly permeable, and loamy. They are on uplands. Water erosion is a moderate hazard. These soils are well drained, and surface runoff is medium to slow. The available water capacity is low.

Most areas of these soils are in native range. In cultivated areas sorghum and small grain are the main crops.

The management objectives in cultivated areas are controlling erosion and conserving moisture. Crop residue managed on the surface helps to reduce the hazard of erosion and to conserve moisture.

CAPABILITY UNIT IVw–1, DRYLAND

Lipan clay is the only soil in this unit. This is a deep, nearly level, very slowly permeable, clayey soil in playas. It is moderately well drained, and surface runoff is very slow. The available water capacity is high.

This soil is suitable for only limited crop production. Most areas are wet or under water for periods of several weeks. Small grain and sorghums are the main crops.

The main limitation to soil management is excess water. The soil is better suited to water-tolerant grasses than to cultivation.

CAPABILITY UNIT IVes–1, DRYLAND

Drake clay loam, 1 to 3 percent slopes, is the only soil in this unit. This is a deep, gently sloping, moderately permeable, loamy soil that is high in content of lime. Soil blowing is a severe hazard. Water erosion is a moderate hazard. The soil is well drained, and surface runoff is medium. The available water capacity is high.

This soil is suitable for only limited cultivation. The main crops are small grain and forage sorghum.

Controlling erosion and conserving moisture are the main management requirements. Terracing and contour farming help to conserve soil and water. A cropping system that returns large amounts of residue, such as small grain, is needed. A suitable cropping system consists of continuous drilled crops, such as small grain. Crop residue managed on the surface effectively controls erosion.

CAPABILITY UNIT Vw–1, DRYLAND

This unit consists of Colorado and Spur soils. These are deep, moderately permeable, loamy soils on flood plains. They are well drained, and surface runoff is slow.

Frequent flooding is a hazard during periods of runoff. During these periods the soils are also subject to a slight scouring and to the deposition of new materials. Soil blowing is a slight hazard.

Because of the flooding hazard, the soils are not suitable for cultivation. They are suited to use as range, wildlife habitat, or recreational areas.

CAPABILITY UNIT VIe–1, DRYLAND

This unit consists of deep, gently sloping, moderately and slowly permeable, loamy and clayey soils on uplands. The soils are well drained, and surface runoff is rapid.

These soils are not suitable for cultivation. They are suited to use as range, recreational areas, or wildlife habitat.

CAPABILITY UNIT VIe–2, DRYLAND

This unit consists of very shallow to deep, gently sloping to steep, loamy soils on uplands. These soils are well drained to somewhat excessively drained, and surface runoff is medium to rapid. The hazard of water erosion is moderate to high. The hazard of soil blowing is slight to moderate.

The soils in this unit are not suited to cultivation. They can be used for range, recreational areas, or wildlife habitat.

CAPABILITY UNIT VIe–4, DRYLAND

This unit consists of Quinlan soils. These are shallow, gently sloping to steep, moderately rapidly permeable, loamy soils on uplands. Water erosion is a moderate to severe hazard. The soils are well drained to somewhat excessively drained, and surface runoff is medium to rapid.

The areas of these soils are not suitable for cultivation. They are suited to use as range, recreational areas, or wildlife habitat.

CAPABILITY UNIT VIe–7, DRYLAND

Brownfield fine sand is the only soil in this unit. This is a deep, nearly level to gently undulating, moderately permeable, sandy soil on uplands. The soil is well drained, and surface runoff is very slow.

This soil is not suitable for cultivation. It is suited to use as range, recreational areas, or wildlife habitat.

CAPABILITY UNIT VIs–1, DRYLAND

Hilgrave gravelly fine sandy loam is the only soil in this unit. This is a moderately deep, gently sloping to steep, gravelly soil on uplands. The soil is well drained, and surface runoff is medium to rapid. The available water capacity is medium.

This soil is not suitable for cultivation, because it is steep and gravelly. It is suited to use as range, recreational areas, or wildlife habitat. A few areas are used as a source of commercial gravel.

CAPABILITY UNIT VIs–2, DRYLAND

This unit consists of Mangum and Colorado soils. These are deep, nearly level, stratified, clayey and loamy soils on flood plains. They are moderately and very slowly permeable and well drained and moderately well drained. Frequent flooding is a hazard during periods of runoff. During these periods the soils are subject to slight scouring and to the deposition of new materials.

These soils are not suitable for cultivation. They are suited to use as range, wildlife habitat, or recreational areas.

CAPABILITY UNIT VIIe–1, DRYLAND

Tivoli fine sand is the only soil in this unit. This is a deep, undulating to hummocky, rapidly permeable, sandy soil on uplands. It is excessively drained, and surface runoff is very slow. Erosion is a severe hazard.

Because of the erosion hazard, this soil is not suitable for cultivation. It is suited to use as range, recreational areas, or wildlife habitat.

CAPABILITY UNIT VIIs–1, DRYLAND

This unit consists of gently sloping to steep, very shallow and shallow, moderately permeable, loamy soils on uplands. Water erosion is a moderate to severe hazard. The soils are well drained, and surface runoff is medium to rapid. The available water capacity is low.

These soils are too shallow for cultivation. They are suited to use as range, recreational areas, or wildlife habitat.

CAPABILITY UNIT VIIs–2, DRYLAND

This unit consists of rough, broken, and steep areas along the cap rock escarpment and strongly dissected and eroded clayey red-bed areas.

The areas of this unit are too steep and too erosive to cultivate. Small spots at the crest of the steep areas and small benches or shelves above the drains have soil material deep enough to grow small amounts of forage for grazing. These areas are suited only to use as range, wildlife habitat, or recreational areas. Many of the steeper area are inaccessible to cattle.

Irrigation

Irrigation is a fairly new practice in Scurry County. About 80 wells have been drilled, and a total area of approximately 4,000 acres is irrigated. Irrigation is a supplemental practice, used chiefly in periods of drought.

Most of the irrigated areas are in the north-central part of the county, just north of Snyder. Other smaller areas are scattered throughout the county.

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All water used for irrigation comes from deep wells. Most of the wells are 200 to 500 feet deep. They vary in production, ranging from 50 to 500 gallons per minute.

The two kinds of irrigation systems used are row and sprinkler. Row irrigation is used on the nearly level, medium-textured and moderately fine textured soils. In some places land leveling is necessary before row irrigation can be used. Sprinkler irrigation is effective on most slopes and is especially well suited to the sandy soils.

Yields produced under irrigation can be expected to be one and a half to two times the amount produced under dryland farming.

Estimated yields

Crop yields in Scurry County under dryland farming depend chiefly on the tilth and fertility of the soil and the available water supply at planting time and during the growing season. Generally, the higher the rainfall the higher the yields. Consistently high yields depend on good soil management. Good management includes maintenance of fertility, maintenance of good soil tilth, and conservation of rainwater. If these practices are not used, crop yields can be expected to be lower.

Table 2 gives estimated average yields of cotton, wheat, and grain sorghum under a high level of management. This level of management is one in which all the best known methods of farming are used.

The high level of management includes those treatments that are needed for any specific combination of soils, crops, livestock, and climate. Such treatments include timely application of erosion control measures; proper tillage; control of weeds, insects, and disease; and the use of top-quality seed.

TABLE 2.—*Estimated average yields per acre of principal dryland crops*

[Dashes indicate the crop is not grown on the soil or the soil is not suited to it]

Soil	Cotton (lint)	Wheat	Grain sorghum
	Lb.	*Bu.*	*Lb.*
Berda loam, 1 to 3 percent slopes			
Brownfield fine sand			
Carey loam, 1 to 3 percent slopes	275	20	1, 500
Colorado and Spur soils			
Drake clay loam, 1 to 3 percent slopes	100		495
Hilgrave gravelly fine sandy loam			
Latom soils			
Lea-Kimbrough-Slaughter complex			
Lipan clay			500
Mangum and Colorado soils			
Mansker loam, 0 to 1 percent slopes	225	18	1, 300
Mansker loam, 1 to 3 percent slopes	200	15	1, 200
Mansker loam, 3 to 5 percent slopes			600
Mansker-Potter complex			
Miles fine sandy loam, 0 to 1 percent slopes	275	20	1, 500
Miles and Cobb fine sandy loams, 1 to 3 percent slopes	250	18	1, 400
Miles and Cobb fine sandy loams, 3 to 5 percent slopes	175	12	875
Miles loamy fine sand, 0 to 3 percent slopes	200		1, 200
Olton clay loam, 0 to 1 percent slopes	290	21	1, 800
Olton clay loam, 1 to 3 percent slopes	275	20	1, 500
Olton loam, 0 to 1 percent slopes	290	21	1, 800

TABLE 2.—*Estimated average yields per acre of principal dryland crops*—Continued

Soil	Cotton (lint)	Wheat	Grain sorghum
	Lb.	*Bu.*	*Lb.*
Olton loam, 1 to 3 percent slopes	275	20	1,500
Potter soils			
Quinlan soils			
Roscoe clay	200	18	1,500
Rough broken and stony land			
Rowena-Abilene complex, 0 to 1 percent slopes	350	25	2,000
Rowena-Abilene complex, 1 to 3 percent slopes	275	20	1,500
Spade-Latom fine sandy loams, 1 to 3 percent slopes	125	10	830
Spade-Latom fine sandy loams, 3 to 5 percent slopes			
Spur clay loam	325	24	1,500
Spur fine sandy loam			
Stamford clay, 0 to 1 percent slopes	215	15	1,200
Stamford clay, 1 to 3 percent slopes	180	12	1,000
Tivoli fine sand			
Veal fine sandy loam, 1 to 3 percent slopes	200	10	830
Veal fine sandy loam, 3 to 5 percent slopes	175	9	805
Vernon clay, 1 to 3 percent slopes			
Vernon clay, 3 to 5 percent slopes			
Vernon-Badland complex			
Vernon-Potter complex			
Weymouth-Vernon clay loams, 1 to 3 percent slopes	100	11	815
Weymouth-Vernon clay loams, 3 to 5 percent slopes			
Woodward loam, 1 to 3 percent slopes	275	20	1,500

Rainfall is conserved by using all necessary conservation measures, including properly maintained terrace systems, contour farming, and stubble mulching. Soil fertility is maintained or improved by timely application of fertilizer, based on soil tests and crop needs. The high level of management also includes efficient use of crop residue, barnyard manure, and green-manure crops, together with a good cropping system to control erosion and maintain optimum soil organic-matter content.

Yield estimates were not made for soils under irrigation, but yields are higher for such soils.

Use and Management of Range [2]

About 345,336 acres, or 59 percent of the agricultural land of the county, is in native grasses. Raising livestock is a major industry. Cows and calves are the chief livestock, along with some winter stockers or carry-over calves, which graze small grain. Most ranches include some cropland that is used for supplemental grazing. The chief crops used for this purpose are small grains, sudangrass, and sorghum stubble.

The native grass cover in most of the county consists of a mixture of mid and short grasses. The sandy loam and loam soils throughout the county were originally characterized by good stands of side-oats grama, Arizona cottontop, blue grama, and buffalograss. On the deep clay soils, blue grama and smaller amounts of side-oats grama, Arizona cottontop, and vine-mesquite were originally the important grasses; these were generally replaced by tobosagrass and buffalograss if the soils were not properly managed. Although the shallow soils produce the smallest amount of total vegetation, they support a fair stand of side-oats grama, black grama, slim tridens, and perennial three-awn. Because of overstocking and periodic droughts, undesirable plants have increased and have invaded all range sites. Mesquite and other brush, along with many kinds of weeds, have replaced many of the mid and short grasses.

The climate of the county is one of extremes and has a marked influence on the production of forage. Rainfall is erratic, in both amount and distribution. Most of it occurs in a 6-month period, April through September. Many of the rains in these months are of high intensity and short duration, and they cause severe runoff, but some are ineffective showers. Droughts are common and range from midsummer dry periods of 30 to 90 days to droughts that persist for 1 year to several years. Low-rainfall periods and high wind velocities that cause excessive evaporation and transpiration not only retard plant growth but often result in widespread loss of grass stands.

Range sites and condition classes

Soils differ in their capacity to produce grass and other plants for grazing. The soils that produce about the same kind and amount of forage, if the range is in similar condition, make up what is called a range site.

Range sites differ in their capacity to produce various kinds or proportions of vegetation. The soils of any one range site produce about the same kind of climax vegetation. The potential plant community is the stabilized plant community on a particular site; it reproduces itself and does not change, so long as the environment remains unchanged. Throughout most of the prairie and the plains areas, the potential plant community consists of the plants that were growing there when the region was first settled. If cultivated crops are not to be grown, the most productive combination of plants on a range site is generally the climax vegetation.

The plants on any given range site are grouped, according to their response to being grazed, as decreasers, increasers, and invaders.

Decreasers are species in the potential plant community that tend to decrease in relative abundance under close grazing. They generally are the most productive perennial grasses and forbs and the most palatable to livestock.

Increasers are species in the potential plant community that increase in relative abundance as the more desirable plants are reduced by close grazing. They are commonly shorter than decreasers, and most are less palatable to livestock.

Invaders are plants that cannot withstand the competition for moisture, nutrients, and light in the climax vegetation. They come in and grow along with the increasers after the climax vegetation has been reduced by grazing or other forms of disturbance. Many of the invaders are annual weeds; some are shrubs that have some grazing value; but others have little or no value for grazing.

[2] By ALTON T. WILHITE, range conservationist, Soil Conservation Service, Big Spring.

Four range condition classes indicate the degree of departure from the native, or original, vegetation brought about by grazing or other use. The classes show the present condition of the native vegetation on a range site in relation to the native vegetation that should grow there. A range site is in excellent condition if 76 to 100 percent of the present vegetation is of the same kind as in the original stand. It is in good condition if the percentage is between 51 and 75, in fair condition if the percentage is between 26 and 50, and in poor condition if the percentage is less than 25. Current forage production depends on the range condition and the moisture that the plants receive during their growing season.

One of the main objectives of good range management is to keep the range in excellent or good condition. If this is done, water is conserved, yields are improved or maintained, and the soils are protected. The key to keeping the range in good condition is recognizing important changes in the kind of cover on a range site. These changes take place gradually and can be overlooked or misinterpreted. Growth encouraged by heavy rainfall may lead to the conclusion that the range is in good condition, when actually the cover is weedy and the long-time trend is toward lower production. On the other hand, some rangeland that has been closely grazed for relatively short periods under the supervision of a careful manager may have a deteriorated appearance that temporarily conceals its quality and the likelihood of recovery.

Trends in range condition

Within the survey area the trend in the condition of range vegetation is generally downward. This is in spite of good range management and improvement achieved by many ranchers who practice conservation.

This downward trend can be attributed to three significant factors: 1, the continued invasion by brush of nearly all range sites; 2, periodic drought; and 3, grazing more livestock than the ranges can support. All factors are strongly influenced by the usual close grazing of the most palatable and nutritious plants.

In addition to the need for good range management throughout the county, treatment measures are needed on much of the rangeland. Such measures include brush control, range seeding, and water control.

Range sites that respond most favorably to brush control are Deep Hardland, Loamy Bottomland, Mixedland, Sandy Loam, Sandyland, Deep Sand, and Shallow Redland.

Range seeding is most effective on Mixedland, Sandy Loam, Loamy Bottomland, and Sandyland sites.

The use of water control measures is confined primarily to sites that are smooth enough and level enough to control water from rainfall and runoff in varying amounts. Range sites well suited to this treatment are Deep Hardland and Sandy Loam. Soils of the Loamy Bottomland site may also be suitable if the particular area is not subject to frequent flooding.

The effectiveness and value of range improvement practices depend on methods of application of the practices and maintenance and management of the area involved.

Descriptions of range sites

The soils of Scurry County have been grouped in 11 range sites. The soils that make up each site can be learned by referring to the "Guide to Mapping Units" at the back of this survey. The description of each range site gives significant soil characteristics, lists the principal range plants, and gives estimates of annual herbage yields to be expected if the range is in excellent condition. The estimates are based on samples clipped at ground level and air dried.

CLAY FLAT RANGE SITE

This range site consists of deep, nearly level to gently sloping soils on broad flats, in valleys, and on alluvial fans. Most areas have concave surfaces.

Although this site receives additional moisture from adjoining areas, the range condition is generally poor to fair and the vegetation is of poor quality. The vegetation consists mostly of grasses that have low moisture and air requirements.

Decreasers make up 25 to 35 percent of the potential plant community. The important decreasers are side-oats grama, blue grama, white tridens, and vine-mesquite. The increasers are mostly tobosagrass and buffalograss (fig. 11). Common invaders are mesquite, pricklypear cactus, and annuals.

If unprotected by plant cover, the soils crust. This crusting inhibits infiltration and increases the hazard of water erosion.

If the site is in excellent condition, the annual yield of air-dry herbage is about 2,500 pounds per acre in years when the amount of moisture is favorable. It is about 800 pounds per acre in years when the amount of moisture is unfavorable.

DEEP HARDLAND RANGE SITE

This range site consists of smooth, nearly level to gently sloping soils on plains. In most places drainage is into small, numerous swales and intermittent drainageways. Small swales and depressions are common even in areas of the more nearly level soils. If the soils of this site are not protected, water erosion is a hazard.

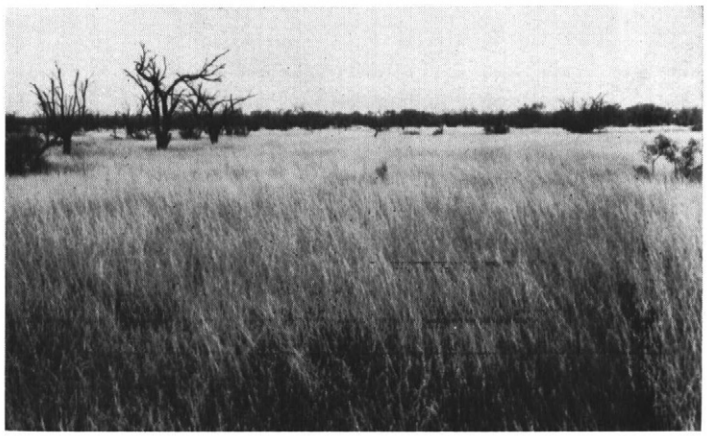

Figure 11.—**An area of Clay Flat range site. The grass is tobosagrass. The soil is Stamford clay.**

Decreasers make up 45 to 55 percent of the potential plant community. The major decreasers are blue grama, side-oats grama, vine-mesquite, and Arizona cottontop. The more hardy increasers are tobosagrass and buffalograss. Common invaders are mesquite, lotebush, pricklypear, and annuals.

If the site is in excellent condition, the annual yield of air-dry herbage is about 2,500 pounds per acre in years when the amount of moisture is favorable. It is about 1,500 pounds per acre in years when the amount of moisture is unfavorable.

DEEP SAND RANGE SITE

This range site consists of deep, sandy soils. If the soils are not protected, erosion is a severe hazard. If properly managed, they produce a good stand of mid and tall grasses.

Decreasers make up about 65 to 75 percent of the potential plant community. The most important decreasers are sand bluestem, little bluestem, giant dropseed, indiangrass, silver bluestem, and cane bluestem. The increasers are sand dropseed, fall witchgrass, perennial three-awn, and Harvard oak. Common invaders are annual grasses and weeds.

Any deterioration of this site results in a rapid increase of woody plants, particularly shin oak, sand plum, and skunkbush. As deterioration progresses, these woody plants almost completely replace the more desirable grasses.

This range site is highly productive if it is maintained in good condition. Since there are few grasses of intermediate grazing value on this site, production drops rapidly once the climax vegetation is overgrazed. Recovery is rapid if brush is controlled and grazing deferred.

If the site is in excellent condition, the annual yield of air-dry herbage is about 3,400 pounds per acre in years when the amount of moisture is favorable. It is about 1,700 pounds per acre in years when the amount of moisture is unfavorable.

GRAVELLY RANGE SITE

Hilgrave gravelly fine sandy loam is the only soil in this range site. It is a moderately deep soil on gravelly hills adjacent to major and intermittent streams. If the soil is not protected by plant cover, water erosion is a severe hazard.

Decreasers make up 65 to 75 percent of the potential plant community. The important decreasers are side-oats grama, little bluestem, blue grama, black grama, Arizona cottontop, and plains bristlegrass. The increasers are hairy grama, buffalograss, slim tridens, sand dropseed, and perennial three-awn. Common invaders are hairy tridens, mesquite, juniper, pricklypear cactus, and annuals.

Any deterioration of this site results in a rapid decrease of little bluestem and side-oats grama and a rapid increase of three-awn, mesquite, and juniper.

If the site is in excellent condition, the annual yield of air-dry herbage is about 1,800 pounds per acre in years when the amount of moisture is favorable. It is about 1,100 pounds per acre in years when the amount of moisture is unfavorable.

LOAMY BOTTOMLAND RANGE SITE

This range site (fig. 12) consists of deep soils in narrow draws and on river bottoms within flats. It is subject to flooding and receives runoff from adjoining range sites. In dry periods this site may provide the only green forage on the range.

Decreasers make up 55 to 65 percent of the potential plant community. The decreasers are side-oats grama, sand bluestem, Canada wildrye, white tridens, and plains bristlegrass. The increasers are vine-mesquite, cane bluestem, silver bluestem, blue grama, tobosagrass, and Texas wintergrass. Invaders are mesquite, lotebush, tasajillo, pricklypear, and annual and perennial weeds.

Any deterioration of this site results in a rapid increase of mesquite and other shrubs.

If the site is in excellent condition, the annual yield of air-dry herbage is about 3,600 pounds per acre in years when the amount of moisture is favorable. It is about 2,000 pounds per acre in years when the amount of moisture is unfavorable.

MIXEDLAND RANGE SITE

This range site consists of gently sloping to steep, deep to shallow soils on uplands where there are rolling hills and defined drainage patterns. These drainageways are smooth and well grassed. If the soils are not protected by plant cover, erosion is a hazard.

Decreasers make up approximately 60 to 65 percent of the potential plant community. These are side-oats grama, Arizona cottontop, vine-mesquite, cane bluestem, silver bluestem, and blue grama. Important increasers are hairy grama, buffalograss, sand dropseed, and perennial three-awn. Mesquite, pricklypear, sand muhly, red grama, and annuals are the principal invaders.

Any deterioration of this site results in an immediate decrease of side-oats grama and a rapid invasion of mesquite. As deterioration continues, buffalograss, mesquite, and annuals characterize the site and the hazard of erosion increases.

If the site is in excellent condition, the annual yield of air-dry herbage is about 2,700 pounds per acre in years when the amount of moisture is favorable. It is about 1,600 pounds per acre in years when the amount of moisture is unfavorable.

Figure 12.—**An area of the Loamy Bottomland range site that has a good stand of mid grasses. Mesquite has invaded this site. The soils are of the Spur series.**

ROUGH BROKEN RANGE SITE

This range site (fig. 13) consists of Rough broken and stony land. The areas are on steep escarpments and in the severely eroded scald areas below the escarpments. The site has an overall appearance of rough breaks.

The plant cover on this site is sparse and variable because of differences in soil material, slope, exposure, and degree of geologic erosion. A large part of the site is almost inaccessible to livestock. Any deterioration of grass cover results in accelerated erosion.

Decreasers make up 70 to 80 percent of the potential plant community. Little bluestem, side-oats grama, cane bluestem, silver bluestem, and vine-mesquite are the most abundant decreasers. The principal increasers are black grama, hairy grama, slim tridens, perennial three-awn, and tobosagrass on the lower slopes. Common invaders are juniper and annuals.

SANDYLAND RANGE SITE

Miles loamy fine sand, 0 to 3 percent slopes, is the only soil in this range site. This is a deep, sandy soil on uplands.

If the soil is not protected by plant cover, erosion is a hazard. If properly managed, the site will produce a good stand of mid grasses and some tall grasses.

Decreasers make up approximately 60 to 70 percent of the potential plant community on this site. Among these are little bluestem, giant dropseed, sand bluestem, side-oats grama, and plains bristlegrass. The principal increasers are hooded windmillgrass, fall witchgrass, sand dropseed, perennial three-awn, and shin oak. The common invaders are annual grasses and weeds.

Any deterioration of this site generally results in a rapid increase of shin oak. If brush is controlled and grazing deferred, recovery is rapid.

If the site is in excellent condition, the annual yield of air-dry herbage is about 3,200 pounds per acre in years when the amount of moisture is favorable. It is about 1,700 pounds per acre in years when the amount of moisture is unfavorable.

SANDY LOAM RANGE SITE

This range site consists of nearly level to gently sloping soils on uplands. The soils are very shallow to deep.

Decreasers make up about 60 to 65 percent of the potential plant community. The most important decreasers are side-oats grama, blue grama, cane bluestem, silver bluestem, Arizona cottontop, and plains bristlegrass. The increasers are mainly black grama, hooded windmillgrass, buffalograss, and perennial three-awn. Common invaders are mesquite, catclaw, yucca, and annuals.

Any deterioration of this site results in an immediate decrease of side-oats grama. If continuously overgrazed, the range vegetation soon consists of three-awn, annuals, and mesquite.

This site is capable of good production of forage if it is in good condition. After deterioration, recovery is slow.

If this site is in excellent condition, the annual yield of air-dry herbage is abut 3,000 pounds per acre in years when the amount of moisture is favorable. It is about 1,800 pounds per acre in years when the amount of moisture is unfavorable.

Figure 13.—An area of the Rough Broken range site on escarpments of hills.

SHALLOW REDLAND RANGE SITE

This range site (fig. 14) consists of gently sloping to steep, very shallow to deep soils. It is associated with the Rough Broken, Deep Hardland, and Clay Flat range sites.

The soils of this site are droughty. The site supports a sparse stand of drought-resistant plants. Many areas have eroded to such an extent that they no longer support any kind of vegetation except invading perennial forbs or sparse stands of woody plants.

Decreasers make up approximately 35 to 45 percent of the potential plant community. The decreasers are side-oats grama, blue grama, vine-mesquite, cane bluestem, and silver bluestem. The principal increasers are tobosagrass, buffalograss, and perennial three-awn. In saline areas, alkali sacaton is an increaser. Common invaders are mesquite, juniper, and annuals.

If the site is in excellent condition, the annual yield of air-dry herbage is about 2,000 pounds per acre in years when the amount of moisture is favorable. It is about 1,200 pounds per acre in years when the amount of moisture is unfavorable.

VERY SHALLOW RANGE SITE

This range site (fig. 15) consists of gently sloping to steep, deep to very shallow soils. If the soils are not protected by plant cover, erosion is a hazard.

Decreasers make up 65 to 75 percent of the potential plant community. The decreasers are mainly little bluestem, side-oats grama, plains bristlegrass, cane bluestem, and silver bluestem. The increasers are mainly slim tridens, hairy grama, fall witchgrass, and perennial three-awn. Common invaders are javelinabrush, broom snakeweed, and annuals.

If this site is in excellent condition, the annual yield of air-dry herbage is about 1,700 pounds per acre in years when the amount of moisture is favorable. It is about 800 pounds per acre in years when the amount of moisture is unfavorable.

Use of Soils for Wildlife

Most of the soils of Scurry County are suited to, and support, one or more species of wildlife. The county is mostly open prairie. The soils are nearly level to steep. About 59 percent of the acreage remains in native grassland, and the rest is cultivated.

Early settlers in the county found an abundance of antelope, buffalo, prairie chicken, and quail. The buffalo had been exterminated by hunters by the time the county was settled. After the county was settled and livestock were introduced, overgrazing, fencing, and cultivation of the soil reduced the numbers of antelope, deer, and prairie chicken. Prairie dogs, once numerous, are now almost extinct. Large numbers of quail, doves, songbirds, small animals, and predators still inhabit the county. Habitats for fish are limited to artificial impoundments, such as Lake Thomas and ponds on ranches.

In recent years people have begun to realize the value and importance of wildlife. More and more people are looking to the land for recreation, and hunting and fishing are becoming more important. Scurry County has a moderate potential for the profitable development of hunting, fishing, or recreation areas.

Descriptions of wildlife sites

The soils of this county have been placed in three wildlife sites, which are made up of one or more soil associations. The soil associations are shown on the general soil map at the back of this survey and are described in the section "General Soil Map." Each wildlife site is unique in topography, productivity, kinds and amount of vegetation, and principal species of wildlife that inhabit the site.

WILDLIFE SITE 1

This site consists mainly of the Rowena-Abilene-Olton soil association. The soils are deep and nearly level to gently sloping. Most of the acreage is cultivated. The native vegetation consists mainly of such grasses as side-oats grama, blue grama, vine-mesquite, and associated legumes and forbs. Water-tolerant grasses, sedges, and forbs grow in and around the playas.

The principal kinds of wildlife on this site are badger, coyote, and rabbit. Among the species of birds are turkeys, doves, ducks, geese, quail, and songbirds.

WILDLIFE SITE 2

This site consists mainly of the Mansker-Potter, Vernon-Stamford, and Quinlan-Broken land associations. The soils are very shallow to deep and nearly level to steep. Most of the acreage is used for range. The native vegetation consists of buffalograss, blue grama, side-oats grama, cane bluestem, silver bluestem, vine-mesquite, and perennial three-awn. A few scattered mesquite trees grow on the soils.

Deer, bobcat, raccoon, rabbit, coyote, opossum, skunk, and badger inhabit this site. The principal kinds of birds are turkeys, doves, quail, prairie chicken, ducks, geese, and songbirds.

WILDLIFE SITE 3

This site consists mainly of the Miles-Cobb soil association. The soils are deep and nearly level to gently sloping. Most of the acreage is cultivated. The native vegetation consists mainly of mid and tall grasses, such as plains bristlegrass, cane bluestem, silver bluestem, Arizona cottontop, black grama, and side-oats grama. Mesquite and catclaw also grow on this site.

Deer, skunk, raccoon, rabbit, bobcat, and coyote are the principal animals on this site. Among the species of birds are turkeys, quail, doves, prairie chicken, ducks, geese, and songbirds.

Engineering Uses of the Soils [3]

This section provides information of special interest to engineers, contractors, farmers, and others who use soil as structural material or as foundation material upon which structures are built. In this section are described those properties of the soils that affect construction and maintenance of roads and airports, pipelines, building foundations, water storage facilities, erosion control structures, drainage systems, and sewage disposal systems. Among the soil properties most important in engineering are permeability, shear strength, density,

[3] By LEE H. WILLIAMSON, engineer, Soil Conservation Service, Big Spring.

Figure 14.—**An area of the Shallow Redland range site, which consists of soils of the Vernon series and of Badland.**

shrink-swell potential, available water capacity, grain-size distribution, plasticity, and reaction.

Information concerning these and related soil properties is furnished in tables 3 and 4. Table 3 gives estimated properties of the soils, and table 4 gives engineering interpretations. These estimates and interpretations can be used in—

1. Planning agricultural drainage systems, farm ponds, irrigation systems, diversion terraces, and other structures for controlling water and conserving soil.
2. Selecting potential locations for highways, airports, pipelines, and underground cables.
3. Locating probable sources of topsoil for topdressing or road subgrade suitable for use as construction material.
4. Selecting potential industrial, commercial, residential, and recreational areas.
5. Determining the suitability of soils for the cross-country movement of vehicles and construction equipment.
6. Obtaining supplemental information from other published maps, reports, and aerial photographs for the purpose of making maps and reports that can be used readily by engineers.
7. Developing other preliminary estimates for construction purposes pertinent to the particular area.

The engineering interpretations reported here do not eliminate the need for sampling and testing at the site of specific engineering works involving heavy loads and

Figure 15.—**An area of the Very Shallow range site, which consists of soils of the Mansker and Potter series.**

TABLE 3.—*Estimated properties*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soil. The soils in referring to other series that appear in the first column of this table.

Soil series and map symbols	Hydrologic group	Depth to bedrock	Depth from surface	Classification		
				USDA texture	Unified	AASHO
		Inches	*Inches*			
Abilene	C	>60	0–7	Clay loam	CL	A–6
(Mapped only with Rowena soils)			7–15	Silty clay loam	CL	A–6
			15–46	Clay	CH	A–7
			46–64	Silty clay loam	CL	A–6
Berda: BeB	B	>60	0–9	Loam	CL	A–6
			9–50	Clay loam	CL	A–6
			50–62	Loam	CL	A–6
Brownfield: Br	A	>60	0–26	Fine sand	SP or SM	A–2
			26–48	Sandy clay loam	SC	A–2 or A–6
			48–60	Fine sandy loam	SC	A–6
Carey: CaB	B	38–62	0–10	Loam	ML or ML-CL or CL	A–4 or A–6
			10–35	Silty clay loam	CL	A–6
			35–48	Clay loam	CL	A–4
			48–56	Permian sandstone.		
Cobb	B	26–48	0–10	Fine sandy loam	SM	A–4
(Mapped only with Miles soils)			10–38	Sandy clay loam	SC or CL	A–6
			38–44	Sandstone.		
*Colorado: Co	B	>60	0–7	Clay loam	ML or CL	A–4 or A–6
For Spur part of Co, see Spur series.			7–24	Silty clay loam	ML or CL	A–4 or A–6
			24–48	Clay loam	ML or CL	A–4 or A–6
Drake: DcB	B	>60	0–60	Clay loam	CL	A–6
Hilgrave: Hg	B	>60	0–7	Gravelly fine sandy loam	SM	A–2 or A–4
			7–34	Gravelly sandy clay loam	SC or GC	A–6
			34–38	Sandy red-bed material.		
Kimbrough	C	7–9	0–7	Clay loam	CL	A–6
(Mapped only with Lea and Slaughter soils)			7–10	White indurated caliche.		
Latom: La	D	4–18	0–6	Fine sandy loam	SM	A–2
			6	Cemented calcareous sandstone.		
*Lea: Lk	C	16–36	0–19	Clay loam	CL	A–6
For Kimbrough part of Lk, see Kimbrough series; for Slaughter part of Lk, see Slaughter series.			19–22	Loam	ML or ML-CL	A–4
			22–25	White indurated caliche.		
Lipan: Lp	D	>60	0–62	Clay	CH	A–7
*Mangum: Mc	D	>60	0–48	Clay	CH	A–7
For Colorado part of Mc, see Colorado series.						
*Mansker: MkA, MkB, MkC, Mp	B	>60	0–7	Loam	CL	A–6
For Potter part of Mp, see Potter series.			7–62	Clay loam	CL	A–6
*Miles: MrA, MsB, MsC, MuB	B	>60	0–8	Fine sandy loam	SM	A–2 or A–4
For Cobb part of MsB and MsC, see Cobb series.			8–16	Sandy clay loam	SC	A–6
			16–52	Sandy clay loam	SC or CL	A–6
			52–70	Sandy clay loam	SC	A–6
Olton: OcA, OcB, OlA, OlB	C	>60	0–7	Clay loam	CL	A–6
			7–18	Clay loam	CL	A–6
			18–25	Clay	CL	A–6
			25–62	Clay loam	CL	A–6

significant in engineering

such mapping units may have different properties and limitations, and for this reason it is necessary to follow carefully the instructions for
The symbol > means more than and the symbol < means less than]

Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)				
				Inches per hour	*Inches per inch of soil*	*pH*	
100	100	95–99	85–90	0. 63–2. 0	0. 15–0. 20	6. 6–8. 4	Moderate.
100	100	95–99	85–90	0. 20–0. 63	0. 15–0. 20	6. 6–8. 4	Moderate.
100	100	95–99	80–95	0. 20–0. 63	0. 14–0. 18	7. 4–8. 4	Moderate.
100	100	95–98	80–95	0. 20–0. 63	0. 12–0. 17	7. 4–8. 4	Moderate.
100	100	85–90	50–60	0. 63–2. 0	0. 12–0. 15	7. 9–8. 4	Low.
100	100	90–95	50–60	0. 63–2. 0	0. 13–0. 17	7. 9–8. 4	Low.
100	100	85–90	50–60	0. 63–2. 0	0. 12–0. 15	7. 9 8. 4	Low.
100	100	70–80	10–20	6. 3–20. 0	0. 05–0. 09	6. 1–7. 3	Low.
100	100	80–90	30–45	0. 63–2. 0	0. 14–0. 16	6. 1–7. 8	Low.
100	100	75–80	40–50	2. 0–6. 3	0. 11–0. 15	6. 6–7. 3	Low.
100	100	95–100	60–75	0. 63–2. 0	0. 12–0. 15	7. 4–7. 8	Low.
100	100	95–100	90–95	0. 63–2. 0	0. 14–0. 18	7. 4–7. 8	Low.
100	100	95–100	70–80	0. 63–2. 0	0. 14–0. 17	7. 9–8. 4	Low.
100	100	70–75	40–50	2. 0–6. 3	0. 11–0. 15	6. 6–7. 3	Low.
100	95–100	90–98	40–55	0. 63–2. 0	0. 13–0. 17	6. 6–7. 3	Low.
100	100	90–95	70–80	0. 63–2. 0	0. 15–0. 17	7. 9–8. 4	Low.
100	100	95–100	70–80	0. 63–2. 0	0. 15–0. 17	7. 9–8. 4	Low.
100	100	90–95	70–80	0. 63–2. 0	0. 15–0. 17	7. 9–8. 4	Low.
100	100	90–95	70–80	0. 63–2. 0	0. 11–0. 16	7. 9–8. 4	Low.
65–85	65–85	40–50	30–40	6. 3–20. 0	0. 07–0. 10	7. 4–7. 8	Low.
40–60	40–60	50–60	40–50	2. 0–6. 3	0. 10–0. 12	7. 4–8. 4	Low.
100	100	90–95	70–80	0. 63–2. 0	0. 13–0. 16	7. 9–8. 4	Low.
100	100	80–90	25–35	0. 63–2. 0	0. 10–0. 14	7. 9–8. 4	Low.
100	100	90–95	70–80	0. 63–2. 0	0. 15–0. 20	7. 9–8. 4	Low.
100	100	85–90	70–90	0. 63–2. 0	0. 12–0. 16	7. 9–8. 4	Low.
100	100	90–95	85–90	<0. 06	0. 16–0. 20	6. 6–8. 4	High.
100	100	90–95	85–90	<0. 06	0. 14–0. 18	7. 9–8. 4	High.
100	100	85–90	60–70	0. 63–2. 0	0. 12–0. 16	7. 9–8. 4	Low.
100	100	90–95	70–80	0. 63–2. 0	0. 14–0. 18	7. 9–8. 4	Low.
100	100	70–80	30–40	2. 0–6. 3	0. 11–0. 15	6. 6–7. 3	Low.
100	100	80–85	40–50	0. 63–2. 0	0. 13–0. 17	6. 6–7. 8	Low.
100	100	80–85	40–60	0. 63–2. 0	0. 13–0. 17	6. 6–7. 8	Low.
100	100	85–90	45–50	0. 63–2. 0	0. 12–0. 16	7. 9–8. 4	Low.
100	100	90–95	60–75	0. 63–2. 0	0. 15–0. 20	7. 4–7. 8	Low.
100	100	90–95	70–80	0. 20–0. 63	0. 15–0. 20	7. 4–7. 8	Moderate.
100	100	95–100	75–95	0. 20–0. 63	0. 14–0. 18	7. 4–7. 8	Moderate.
100	100	90–95	70–80	0. 20–0. 63	0. 10–0. 15	7. 4–8. 4	Low.

TABLE 3.—*Estimated properties*

Soil series and map symbols	Hydrologic group	Depth to bedrock	Depth from surface	Classification		
				USDA texture	Unified	AASHO
		Inches	*Inches*			
Potter: Pt	C	9–20	0–6	Loam	ML or ML–CL	A–6
			6–20	Weakly cemented platy caliche.		
Quinlan: Qu	C	10–20	0–15	Loam	ML or CL	A–4
			15–24	Soft sandstone.		
Roscoe: Rc	D	>60	0–17	Clay	CH	A–7
			17–64	Clay	CH	A–7
Rough broken and stony land: Ro. Too variable for reliable evaluation.						
*Rowena: RwA, RwB. For Abilene part of RwA and RwB, see Abilene series.	D	>60	0–7	Clay loam	CL	A–6
			7–30	Clay	CH	A–7
			30–38	Clay	CH	A–7
			38–62	Silty clay loam	CL	A–6
Slaughter (Mapped only with Lea and Kimbrough soils)	C	11–20	0–18	Clay loam	CL	A–6
			18–20	White indurated caliche.		
*Spade: SlB, SlC. For Latom part of SlB and SlC, see Latom series.	B	20–28	0–24	Fine sandy loam	SM	A–4
			24–30	Weakly cemented sandstone.		
Spur: Sp, Sr	B	>60	0–62	Clay loam	CL	A–6
Stamford: StA, StB	D	>60	0–48	Clay	CH	A–7
Tivoli: Tv	A	>60	0–84	Fine sand	SP-SM or SM	A–2–4
Veal: VaB, VaC	B	>60	0–7	Fine sandy loam	SM	A–4
			7–46	Sandy clay loam	SC or CL	A–6
*Vernon: VcB, VcC, Vd, Vp. Estimates not given for Badland part of Vd; for Potter part of Vp, see Potter series.	D	>60	0–16	Clay	CL or CH	A–7
			16–48	Clay	CH	A–7
*Weymouth: WvB, WvC. For Vernon part of WvB and WvC, see Vernon series.	B	>60	0–19	Clay loam	ML-CL or CL	A–6
			19–56	Clay loam	CL	A–6
Woodward: WwB	B	20–40	0–26	Loam	CL or ML-CL	A–4 or A–6
			26–46	Sandstone.		

significant in engineering—Continued

Percentage passing sieve—				Permeability	Available water capacity	Reaction	Shrink-swell potential
No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	*Inches per hour*	*Inches per inch of soil*	*pH*	
90–95	85–90	85–90	60–75	0. 63–2. 0	0. 12–0. 16	7. 9–8. 4	Low.
100	100	85–90	60–75	2. 0–6. 3	0. 12–0. 14	6. 6–8. 4	Low.
100	100	95–100	85–90	0. 06–0. 20	0. 16–0. 20	6. 6–8. 4	High.
100	100	90–95	80–95	<0. 06	0. 16–0. 20	7. 9–8. 4	High.
100	100	90–95	85–90	0. 63–2. 0	0. 15–0. 20	7. 9–8. 4	Moderate.
100	100	95–100	85–90	0. 20–0. 63	0. 14–0. 18	7. 9–8. 4	High.
100	100	95–100	80–95	0. 20–0. 63	0. 14–0. 18	7. 9–8. 4	High.
100	100	95–100	80–95	0. 20–0. 63	0. 12–0. 17	7. 9–8. 4	Moderate.
100	100	90–95	70–80	0. 20–0. 63	0. 15–0. 20	6. 6–7. 8	Low.
100	100	70–80	40–50	0. 63–2. 0	0. 10–0. 14	7. 9–8. 4	Low.
100	100	95–100	75–90	0. 63–2. 0	0. 16–0. 18	7. 9–8. 4	Low.
100	100	90–95	75–95	<0. 06	0. 18–0. 21	7. 4–8. 4	High.
100	100	65–70	10–20	6. 3–20. 0	0. 05–0. 07	7. 4–7. 8	Low.
100	100	85–95	40–50	2. 0–6. 3	0. 10–0. 14	7. 9–8. 4	Low.
100	100	90–100	40–55	0. 63–2. 0	0. 12–0. 16	7. 9–8. 4	Low.
100	100	90–95	75–95	0. 06–0. 20	0. 18–0. 21	7. 9–8. 4	High.
100	100	90–95	75–95	0. 06–0. 20	0. 18–0. 21	7. 9–8. 4	High.
100	100	90–95	70–80	0. 63–2. 0	0. 16–0. 20	7. 9–8. 4	Low.
100	100	90–95	70–80	0. 63–2. 0	0. 16–0. 20	7. 9–8. 4	Low.
100	100	85–90	60–75	0. 63–2. 0	0. 12–0. 15	7. 4–8. 4	Low.

TABLE 4.—*Engineering*

[An asterisk in the first column indicates that at least one mapping unit in this series is made up of two or more kinds of soils. The soils in such mapping units may have

Soil series and map symbols	Suitability as a source of—		Degree of limitations and soil features affecting—				
	Topsoil	Road subgrade	Highway location	Foundations for low buildings	Septic tank filter fields	Sewage lagoons	Camp areas
Abilene (Mapped only with Rowena soils)	Fair: clay loam texture.	Fair: fair traffic-supporting capacity; moderate shrink-swell potential.	Moderate: fair traffic-supporting capacity; moderate shrink-swell potential.	Moderate: moderate shrink-swell potential.	Severe: moderately slow permeability.	Slight	Moderate: moderately slow permeability; clay loam texture.
Berda: BeB	Fair: 6 to 12 inches of loam.	Fair: fair traffic-supporting capacity.	Moderate: fair traffic-supporting capacity.	Slight	Slight	Moderate: moderate permeability.	Slight
Brownfield: Br	Poor: fine sand texture.	Fair: fair traffic-supporting capacity.	Moderate: fair traffic-supporting capacity.	Slight	Moderate: moderate permeability.	Moderate: moderate permeability.	Severe: loose sand.
Carey: CaB	Fair: 7 to 12 inches of loam.	Fair: fair traffic-supporting capacity.	Moderate: fair traffic-supporting capacity.	Slight	Moderate: moderate permeability.	Moderate: moderate permeability.	Slight
Cobb (Mapped only with Miles soils)	Fair: 7 to 12 inches of fine sandy loam.	Fair: fair traffic-supporting capacity.	Severe where bedrock is at a depth of 26 to 36 inches; moderate where bedrock is below 36 inches: fair traffic-supporting capacity.	Slight	Severe: bedrock within 26 to 48 inches.	Severe where bedrock is at a depth of 26 to 40 inches; moderate where bedrock is at a depth of 40 to 48 inches.	Slight
*Colorado: Co For Spur part of Co, see Spur series.	Fair: clay loam texture.	Fair: fair traffic-supporting capacity.	Severe: hazard of flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Moderate: moderate permeability.	Severe: subject to flooding.
Drake: DcB	Fair: clay loam texture.	Fair: fair traffic-supporting capacity.	Moderate: fair traffic-supporting capacity.	Slight	Moderate: moderate permeability.	Moderate: moderate permeability.	Moderate: dust
Hilgrave: Hg	Poor: more than 10 percent fragments.	Fair: 26 to 41 inches of suitable material; fair traffic-supporting capacity.	Moderate: fair traffic-supporting capacity; severe where slope is more than 15 percent.	Slight where slope is 3 to 8 percent; moderate where slope is 8 to 15 percent; severe where slope is more than 15 percent.	Slight where slope is 3 to 5 percent; moderate where slope is 5 to 10 percent; severe where slope is more than 10 percent.	Severe: moderately rapid permeability.	Moderate: 20 to 50 percent coarse fragments on surface; severe where slope is more than 15 percent.
Kimbrough (Mapped only with Lea and Slaughter soils)	Fair: clay loam texture.	Poor: 7 to 9 inches of suitable material.	Severe: 7 to 9 inches to bedrock.	Severe: bedrock at a depth of 7 to 9 inches.	Severe: 7 to 9 inches to bedrock.	Severe: 7 to 9 inches to bedrock.	Severe: 7 to 9 inches to bedrock.

interpretations

different properties and limitations, and for this reason it is necessary to follow carefully the instructions for referring to other series that appear in the first column of this table]

Degree of limitations and soil features affecting—Continued					Soil features affecting—			Corrosivity class and contributing soil features	
Picnic areas	Playgrounds	Paths and trails	Farm ponds		Irrigation	Terraces and diversions	Waterways	Uncoated steel	Concrete
			Reservoir area	Embankments					
Moderate: clay loam texture.	Moderate: moderately slow permeability; clay loam texture.	Moderate: clay loam texture.	Moderate: moderately slow permeability.	Moderate: medium to high compressibility.	Low intake rate.	Moderate shrink-swell potential.	All features favorable.	High: silty clay loam texture.	Low.
Slight	Slight where slope is 0 to 2 percent; moderate where slope is 2 to 6 percent.	Slight	Moderate: moderate permeability.	Moderate: medium compressibility.	All features favorable.	All features favorable.	All features favorable.	Moderate: conductivity; clay loam texture.	Low.
Severe: loose sand.	Severe: loose sand.	Severe: loose sand.	Moderate: moderate permeability.	Moderate: erodibility.	High susceptibility to soil blowing; low available water capacity.	High susceptibility to soil blowing.	High susceptibility to soil blowing.	Moderate: sandy clay loam texture.	Low.
Slight	Slight where slope is 0 to 2 percent; moderate where slope is 2 to 6 percent.	Slight	Moderate: moderate permeability.	Moderate: medium compressibility.	All features favorable.	All features favorable.	All features favorable.	Moderate: clay loam texture.	Low.
Slight	Slight where slope is 0 to 2 percent; moderate where slope is 2 to 6 percent	Slight	Severe: where bedrock is within 26 to 36 inches; moderate where bedrock is at a depth of 36 to 48 inches; moderate permeability.	Moderate: medium compressibility. 26 to 48 inches of material.	Subject to soil blowing.	All features favorable.	All features favorable.	Low	Low.
Severe: subject to flooding.	Severe: subject to flooding.	Severe: subject to flooding.	Moderate: moderate permeability.	Moderate: poor resistance to piping and erosion.	Subject to flooding.	Subject to flooding.	Subject to flooding.	Moderate: clay loam texture.	Low.
Moderate: dust.	Moderate: dust.	Moderate: dust.	Moderate: moderate permeability.	Moderate: medium compressibility.	Highly calcareous soil; hazard of soil blowing.	Hazard of soil blowing.	Highly calcareous soil; hazard of soil blowing.	High: conductivity.	Low.
Moderate: 20 to 50 percent coarse fragments on surface; severe where slope is more than 15 percent.	Moderate where slope is 3 to 6 percent; severe where slope is more than 6 percent.	Moderate: 20 to 50 percent coarse fragments.	Severe: moderately rapid permeability.	Moderate: poor resistance to piping.	Slope; gravelly texture.	Slope; gravelly texture.	Slope; gravelly texture.	Low	Low.
Moderate: clay loam texture.	Severe: 7 to 9 inches to bedrock.	Slight	Severe: 7 to 9 inches to bedrock.	Severe: 7 to 9 inches of suitable material.	Very shallow	Very shallow	Very shallow	High: conductivity.	Low.

TABLE 4.—*Engineering*

Soil series and map symbols	Suitability as a source of—		Degree of limitations and soil features affecting—				
	Topsoil	Road subgrade	Highway location	Foundations for low buildings	Septic tank filter fields	Sewage lagoons	Camp areas
Latom: La	Fair: 4 to 18 inches of fine sandy loam.	Poor: 4 to 18 inches of suitable material.	Severe: 4 to 18 inches to bedrock.	Severe: bedrock at a depth of 4 to 18 inches.	Severe: 4 to 18 inches to bedrock.	Severe: 4 to 18 inches to bedrock.	Severe: 4 to 18 inches to bedrock.
*Lea: Lk For Kimbrough part, see Kimbrough series; for Slaughter part, see Slaughter series.	Fair: clay loam texture.	Poor where only 16 to 24 inches of suitable material; fair where 24 to 36 inches of suitable material.	Severe: 16 to 36 inches to bedrock.	Severe where bedrock is at a depth of 16 to 20 inches; slight where bedrock is at a depth of 20 to 36 inches.	Severe: 16 to 36 inches to bedrock.	Severe: 16 to 36 inches to bedrock.	Moderate: clay loam texture.
Lipan: Lp	Poor: clay texture.	Poor: high shrink-swell potential.	Severe: poor traffic-supporting capacity; high shrink-swell potential.	Severe: high shrink-swell potential.	Severe: very slow permeability.	Slight	Severe: very slow permeability; clay texture.
*Mangum: Mc For Colorado part of Mc, see Colorado series.	Poor: clay texture.	Poor: high shrink-swell potential.	Severe: high shrink-swell potential; subject to flooding.	Severe: high shrink-swell potential; subject to flooding.	Severe: very slow permeability; subject to flooding.	Slight	Severe: very slow permeability; clay texture; subject to flooding.
*Mansker: MkA, MkB, MkC, Mp. For Potter part of Mp, see Potter series.	Fair: 5 to 9 inches of loam.	Fair: fair traffic-supporting capacity.	Moderate: fair traffic-supporting capacity.	Slight	Moderate: moderate permeability.	Moderate: moderate permeability.	Slight
*Miles: MrA, MsB, MsC, MuB. For Cobb part of MsB and MsC, see Cobb series.	Fair: 7 to 12 inches of fine sandy loam.	Fair: fair traffic-supporting capacity.	Moderate: fair traffic-supporting capacity.	Slight	Moderate: moderate permeability.	Moderate: moderate permeability.	Slight
Olton: OcA, OcB, OlA, OlB	Fair: clay loam texture.	Fair: fair traffic-supporting capacity.	Moderate: fair traffic-supporting capacity.	Moderate: moderate shrink-swell potential.	Severe: moderately slow permeability.	Slight	Moderate: moderately slow permeability; clay loam texture.
Potter: Pt	Fair: 9 to 20 inches of loam.	Poor: 9 to 20 inches of suitable material.	Severe: 9 to 20 inches to bedrock.	Severe: bedrock at a depth of 9 to 20 inches.	Severe: 9 to 20 inches to bedrock.	Severe: 9 to 20 inches to bedrock.	Slight where slope is 0 to 8 percent; moderate where slope is 8 to 15 percent; severe where slope is more than 15 percent.

interpretations—Continued

Degree of limitations and soil features affecting—Continued					Soil features affecting—			Corrosivity class and contributing soil features	
Picnic areas	Playgrounds	Paths and trails	Farm ponds		Irrigation	Terraces and diversions	Waterways	Uncoated steel	Concrete
			Reservoir area	Embankments					
Slight where slope is 0 to 8 percent; moderate where slope is 8 to 15 percent; severe where slope is more than 15 percent.	Severe: 4 to 18 inches to bedrock.	Severe where slope is more than 25 percent; moderate where slope is 15 to 25 percent; slight where slope is 0 to 15 percent.	Severe: 4 to 18 inches to bedrock.	Severe: 4 to 18 inches of suitable material.	Very shallow; slope.	Very shallow; slope.	Very shallow; slope.	Low	Low.
Moderate: clay loam texture.	Moderate: clay loam texture.	Moderate: clay loam texture.	Severe: 16 to 36 inches to bedrock.	Severe where there is 16 to 24 inches of material; moderate where there is 24 to 36 inches of material.	Shallow to moderately deep.	Shallow to moderately deep.	All features favorable.	Low	Low.
Severe: clay texture.	Severe: clay texture; very slow permeability.	Severe: clay texture.	Slight	Moderate: fair slope stability.	Very slow permeability.	High shrink-swell potential.	High shrink-swell potential.	High: clay texture.	Low.
Severe: clay texture.	Severe: very slow permeability; clay texture; subject to flooding.	Severe: clay texture.	Slight	Moderate: fair slope stability.	Very slow permeability.	High shrink-swell potential.	High shrink-swell potential.	High: clay texture.	Low.
Slight	Slight where slope is 0 to 2 percent; moderate where slope is 2 to 6 percent.	Slight	Moderate: moderate permeability.	Moderate: fair stability; fair resistance to piping and erosion.	All features favorable.	All features favorable.	All features favorable.	Moderate: conductivity; clay loam texture.	Low.
Slight	Slight where slope is 0 to 2 percent; moderate where slope is 2 to 6 percent.	Slight	Moderate: moderate permeability.	Moderate: fair resistance to piping and erosion.	Subject to soil blowing.	All features favorable.	All features favorable.	Moderate: sandy clay loam texture.	Low.
Moderate: clay loam texture	Moderate: moderately slow permeability; clay loam texture.	Moderate: clay loam texture.	Moderate: moderately slow permeability.	Moderate: fair resistance to piping and erosion.	Low intake rate.	Moderate shrink-swell potential.	All features favorable.	Moderate: clay loam texture.	Low.
Slight where slope is 0 to 8 percent; moderate where slope is 8 to 15 percent; severe where slope is more than 15 percent.	Severe: 9 to 20 inches to bedrock.	Slight where slope is 0 to 15 percent; moderate where slope is 15 to 25 percent.	Severe: 9 to 20 inches to bedrock.	Severe: 9 to 20 inches of material.	Very shallow to shallow; slope.	Very shallow to shallow; slope.	Very shallow to shallow; slope.	Moderate: conductivity.	Low.

TABLE 4.—*Engineering*

Soil series and map symbols	Suitability as a source of—		Degree of limitations and soil features affecting—				
	Topsoil	Road subgrade	Highway location	Foundations for low buildings	Septic tank filter fields	Sewage lagoons	Camp areas
Quinlan: Qu	Fair: 10 to 20 inches of loam.	Poor: 10 to 20 inches of suitable material.	Severe: 10 to 20 inches to bedrock.	Severe: bedrock at a depth of 10 to 20 inches.	Severe: 10 to 20 inches to bedrock.	Severe: moderately rapid permeability; 10 to 20 inches to bedrock.	Slight where slope is 0 to 8 percent; moderate where slope is 8 to 15 percent; severe where slope is more than 15 percent.
Roscoe: Rc	Poor: clay texture.	Poor: high shrink-swell potential.	Severe: poor traffic-supporting capacity; high shrink-swell potential.	Severe: high shrink-swell potential.	Severe: very slow permeability.	Slight	Severe: very slow permeability; clay texture.
Rough broken and stony land: Ro. Too variable for reliable evaluation.							
*Rowena: RwA, RwB. For Abilene part of RwA and RwB, see Abilene series.	Fair: clay loam texture.	Poor: poor traffic-supporting capacity; high shrink-swell potential.	Severe: poor traffic-supporting capacity; high shrink-swell potential.	Severe: high shrink-swell potential.	Severe: moderately slow permeability.	Slight	Moderate: moderately slow permeability; clay loam texture.
Slaughter. (Mapped only with Lea and Kimbrough soils)	Fair: clay loam texture.	Poor: 11 to 20 inches of suitable material.	Severe: 11 to 20 inches to bedrock.	Severe: bedrock within 11 to 20 inches.	Severe: moderately slow permeability; 11 to 20 inches to bedrock.	Severe: 11 to 20 inches to bedrock.	Moderate: moderately slow permeability; clay loam texture.
*Spade: SlB, SlC. For Latom part of SlB and SlC, see Latom series.	Good	Fair: fair traffic-supporting capacity.	Severe: 20 to 28 inches to bedrock.	Slight	Severe: 20 to 28 inches to bedrock.	Severe: 20 to 28 inches to bedrock.	Slight
Spur: Sp, Sr	Fair: clay loam texture.	Fair: fair traffic-supporting capacity.	Moderate: fair traffic-supporting capacity.	Severe: subject to flooding.	Moderate: moderate permeability; floods once in 5 years.	Moderate: moderate permeability.	Severe: floods during season of use.
Stamford: StA, StB	Poor: clay texture.	Poor: high shrink-swell potential.	Severe: poor traffic-supporting capacity; high shrink-swell potential.	Severe: high shrink-swell potential.	Severe: very slow permeability.	Slight	Severe: very slow permeability.
Tivoli: Tv	Poor: fine sand texture.	Good	Slight	Slight	Slight	Severe: rapid permeability.	Severe: loose sand.
Veal: VaB, VaC	Fair: 5 to 8 inches of fine sandy loam.	Fair: fair traffic-supporting capacity.	Moderate: fair traffic-supporting capacity.	Slight	Slight	Moderate: moderate permeability.	Slight

interpretations—Continued

Degree of limitations and soil features affecting—Continued					Soil features affecting—			Corrosivity class and contributing soil features	
Picnic areas	Playgrounds	Paths and trails	Farm ponds		Irrigation	Terraces and diversions	Waterways	Uncoated steel	Concrete
			Reservoir area	Embankments					
Slight where slope is 0 to 8 percent; moderate where slope is 8 to 15 percent; severe where slope is more than 15 percent.	Slight where slope is 0 to 2 percent; moderate where slope is 2 to 6 percent; severe where slope is more than 6 percent.	Slight where slope is 0 to 15 percent; moderate where slope is 15 to 25 percent.	Severe: moderately rapid permeability; 10 to 20 inches to bedrock.	Severe: 10 to 20 inches of suitable material.	Slope; shallow	Slope; shallow	Slope; shallow	Low	Low.
Severe: clay texture.	Severe: very slow permeability; clay texture.	Severe: clay texture.	Slight	Moderate: fair slope stability.	Very slow permeability.	High shrink-swell potential.	High shrink-swell potential.	High: clay texture.	Low.
Moderate: clay loam texture.	Moderate: moderately slow permeability; clay loam texture.	Moderate: clay loam texture.	Moderate: moderately slow permeability.	Moderate: fair slope stability.	Low intake rate.	High shrink-swell potential.	High shrink-swell potential.	High: conductivity.	Low.
Moderate: clay loam texture.	Moderate: moderately slow permeability; clay loam texture.	Moderate: clay loam texture.	Severe: 11 to 20 inches to bedrock.	Severe: 11 to 20 inches of material.	Low intake rate; shallow.	Shallow	All features favorable.	Moderate: clay loam texture.	Low.
Slight	Moderate: 20 to 28 inches to bedrock.	Slight	Severe: 20 to 28 inches to bedrock.	Severe: 20 to 28 inches of material; fair resistance to piping and erosion.	Low available water capacity; subject to soil blowing.	All features favorable.	All features favorable.	Low	Low.
Moderate: clay loam texture; may flood during season of use.	Moderate: clay loam texture; may flood once in 2 years during season of use.	Moderate: clay loam texture.	Moderate: moderate permeability.	Moderate: fair resistance to piping and erosion.	Subject to flooding.	Subject to flooding.	Subject to flooding.	Moderate: clay loam texture.	Low.
Moderate: clay texture.	Severe: clay texture; very slow permeability.	Severe: clay texture.	Slight	Moderate: fair slope stability.	Very slow permeability.	High shrink-swell potential.	High shrink-swell potential.	High: clay texture.	Low.
Severe: loose sand.	Severe: loose sand.	Severe: loose sand.	Severe: rapid permeability.	Severe: high permeability; poor resistance to piping and erosion.	Rapid permeability; hazard of soil blowing.	Poor stability; hazard of soil blowing.	Hazard of soil blowing.	Low	Low.
Slight	Slight where slope is 0 to 2 percent; moderate where slope is 2 to 6 percent.	Slight	Moderate: moderate permeability.	Moderate: medium compressibility.	Hazard of soil blowing.	All features favorable.	All features favorable.	Moderate: conductivity; sandy clay loam texture.	Low.

TABLE 4.—*Engineering*

Soil series and map symbols	Suitability as a source of—		Degree of limitations and soil features affecting—				
	Topsoil	Road subgrade	Highway location	Foundations for low buildings	Septic tank filter fields	Sewage lagoons	Camp areas
*Vernon: VcB, VcC, Vd, Vp. Interpretations are not given for the Badland part of Vd; for Potter part of Vp, see Potter series.	Poor: clay texture.	Poor: high shrink-swell potential.	Severe: high shrink-swell potential.	Severe: high shrink-swell potential.	Severe: slow permeability.	Slight where slope is less than 2 percent; moderate where slope is 2 to 7 percent; severe where slope is more than 7 percent.	Moderate: clay texture; slow permeability.
*Weymouth: WvB, WvC. For Vernon part of WvB and WvC, see Vernon series.	Fair: clay loam texture.	Fair: fair traffic-supporting capacity.	Moderate: fair traffic-supporting capacity.	Slight	Moderate: moderate permeability.	Moderate: moderate permeability.	Moderate: clay loam texture.
Woodward: WwB	Good	Fair: fair traffic-supporting capacity.	Severe where bedrock is at a depth of 20 to 36 inches; moderate where bedrock is at a depth below 36 inches: fair traffic-supporting capacity.	Slight	Severe: bedrock at a depth of 20 to 40 inches.	Severe: bedrock at a depth of 20 to 40 inches.	Slight

where the excavations are deeper than the depths of layers here reported. The estimated values for bearing capacity and traffic-supporting capacity expressed in words should not be assigned specific values. Estimates are generally made to a depth of about 5 feet, and interpretations do not apply to greater depths. There are small areas of other soils and contrasting situations included in the mapping units that may have different engineering properties than those listed. Even in these situations, however, the soil map is useful in planning more detailed field investigations and for indicating the kinds of problems that may be expected.

Some terms used in this survey have a special meaning in soil science and a different meaning in engineering. Many of these terms, such as sand, silt, and clay, are defined in the Glossary.

Engineering classification systems

The two systems most commonly used in classifying soils are the AASHO system,[4] adopted by the American Association of State Highway Officials, and the Unified system,[5] used by the Soil Conservation Service, Department of Defense, and others.

The AASHO system is used to classify soils according to those properties that affect use in highway construction. In this system a soil is placed in one of seven basic groups ranging from A–1 through A–7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A–1 are gravelly soils of high bearing strength, or the best soils for subgrade, and, at the other extreme, clay soils that have low strength when wet. The best soils for subgrade are classified as A–1, the next best A–2, and so on to class A–7, the poorest soils for subgrade.

Where laboratory data are available to justify a further breakdown, the A–1, A–2, and A–7 groups are divided as follows: A–1–a, A–1–b, A–2–4, A–2–5, A–2–6, A–2–7, A–7–5, and A–7–6. If soil material is near a classification boundary, it is given a symbol showing both classes, for example, A–2 or A–4. Within each group, the relative engineering value of a soil material can be indicated by a group index number. Group indexes range from 0 for the best material to 20 for the poorest. The AASHO classification for all soils mapped in the county is given in table 3.

In the Unified system soils are classified according to particle-size distribution, plasticity, liquid limit, and organic-matter content. Soils are grouped in fifteen classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes are designated by symbols for both classes, for example SP–SM.

Engineering properties of the soils

Table 3 provides estimates of soil properties important in engineering. The estimates are based on field classifica-

[4] AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS. STANDARD SPECIFICATIONS FOR HIGHWAY MATERIALS AND METHODS OF SAMPLING AND TESTING. Ed. 8, 2 v., illus. 1961.

[5] DEPARTMENT OF DEFENSE. UNIFIED SOIL CLASSIFICATION SYSTEM FOR ROADS, AIRFIELDS, EMBANKMENTS AND FOUNDATIONS. MIL–STD–619B, 30 pp., illus. 1968.

interpretations—Continued

Degree of limitations and soil features affecting—Continued					Soil features affecting—			Corrosivity class and contributing soil features	
Picnic areas	Playgrounds	Paths and trails	Farm ponds		Irrigation	Terraces and diversions	Waterways	Uncoated steel	Concrete
			Reservoir area	Embankments					
Moderate: clay texture.	Severe: clay texture.	Severe: clay texture.	Slight	Moderate: fair slope stability.	Slow permeability.	High shrink-swell potential.	High shrink-swell potential.	High: clay texture.	Low.
Moderate: clay loam texture.	Moderate: clay loam texture.	Moderate: clay loam texture.	Moderate: moderate permeability.	Moderate: medium compressibility.	All features favorable.	All features favorable.	All features favorable.	Moderate: clay loam texture.	Low.
Slight	Slight where slope is 0 to 2 percent; moderate where slope is 2 to 6 percent.	Slight	Moderate: moderate permeability.	Moderate: medium compressibility.	Low available water capacity.	All features favorable.	All features favorable.	Low	Low.

tion and descriptions, on physical and chemical tests of selected representative samples, on test data from comparable soils in adjacent areas, and on experience in working with the kinds of soil in the survey area.

In the column headed "Hydrologic group", the soils are placed in one of four groups on the basis of intake of water at the end of long-duration storms that occur after prior wetting and opportunity for swelling, and without the protective effects of vegetation. The groups range from open sands (lowest runoff potential—Group A) to heavy clays (highest runoff potential—Group D). Descriptions of these four groups are as follows:

Group A consists of soils that have a high infiltration rate even when thoroughly wetted, chiefly deep, well-drained to excessively drained sand, gravel, or both. These soils have a high rate of water transmission and a low runoff potential.

Group B consists of soils that have a moderate infiltration rate when thoroughly wetted and that are chiefly moderately deep to deep, moderately well drained to well drained, and moderately fine textured to moderately coarse textured. These soils have a moderate rate of water transmission.

Group C consists of soils that have a slow infiltration rate when thoroughly wetted, chiefly soils that have a layer that impedes the downward movement of water, or soils that are moderately fine textured to fine textured. These soils have a slow rate of water transmission.

Group D consists of soils that have a very slow infiltration rate when thoroughly wetted, chiefly clay soils that have a high swelling potential, soils that have a high permanent water table, soils that have a claypan or clay layer at or near the surface, or shallow soils over nearly impervious materials. These soils have a very slow rate of water transmission.

USDA texture is determined by the relative proportions of sand, silt, and clay in soil material that is less than 2.0 millimeters in diameter. "Sand," "silt," "clay," and some of the other terms used in the USDA textural classification are defined in the Glossary.

Permeability, as used in table 3, relates only to movement of water downward through undisturbed and uncompacted soil. It does not include lateral seepage. The estimates are based on structure and porosity of the soil. Plowpans, surface crusts, and other properties resulting from use of the soils are not considered.

Available water capacity is the capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

The depth to a seasonally high water table is not given in this table, because a high water table is not generally a problem in this county.

Reaction is the degree of acidity or alkalinity of a soil, expressed as a pH value. The pH value and relative terms used to describe soil reaction are defined in the Glossary.

Shrink-swell potential is an indication of the volume change to be expected of the soil material with changes in moisture content. Shrinking and swelling of soils cause much damage to building foundations, roads, and other structures. A high shrink-swell potential indicates hazards to the maintenance of structures constructed in, on, or with such materials.

Salinity does not present a serious problem in Scurry County and is not included in table 3.

Engineering interpretations

Table 4 contains selected information useful to engineers and others who plan to use soil material in construction of highways, farm facilities, buildings, and sewage disposal systems. The soil features affecting the use of the soil are shown. Drainage is not a problem in Scurry County and was not considered in preparing the interpretations given in the table. Roscoe and Lipan soils, which occur in depressions, are very slowly permeable, and water stands on these soils for short periods after heavy rain.

The ratings and other interpretations in this table are based on estimated engineering properties of the soils given in table 3 and on field experience. The information applies only to the depths indicated in the table, but it is reasonably reliable to a depth of about 6 feet for most soils, and to a greater depth for some.

Topsoil is a term used to designate a fertile soil or soil material, ordinarily rich in organic matter, used as a topdressing for lawns, gardens, roadbanks, and the like. The ratings indicate suitability for such use.

Ratings of the soils as a source of sand and gravel are not given in this table, because the soils of Scurry County are not generally considered suitable sources. Hilgrave soils are a source of gravel that contains excessive fines.

Road subgrade is material used to build embankments. The ratings indicate performance of soil material moved from borrow areas for such purposes.

Highway location is influenced by features of the undisturbed soil that affect construction and maintenance of highways. A rating is given, and the soil features that affect the rating are shown.

The factors considered for foundations for low buildings are those features and qualities of undisturbed soils that affect suitability for supporting foundations of buildings less than three stories high. The foundations of a building transmit the weight of the structure onto the natural undisturbed soils. It is the substratum of the soil that usually provides the base for foundations, and, therefore, is the material that should be evaluated. The Unified classification system was used for evaluating the soils in terms of their bearing capacity, shrink-swell potential, and shear strength.

Soil features that determine the limitations of the soils for use as septic tank filter fields and sewage lagoons are permeability, ground water level, flooding hazard, slope, depth to rock or other impervious material, and creviced material that provides a channel for seepage that causes pollution of water supplies.

Ratings for camp areas apply to areas suitable for tent and camp trailer sites and the accompanying activities for outdoor living. The sites are used frequently during the camping season. These areas require little site preparation and should be suitable for unsurfaced parking for cars and camp trailers, for heavy foot traffic, for vehicular traffic, and for horseback riding. The soils should be free of coarse fragments and rock outcrops. Suitability of the soil for supporting vegetation is a separate item to be considered in the final evaluation of sites. Items considered in establishing ratings are wetness hazard, flooding hazard, permeability, slope, surface texture of the soil, and stoniness or rockiness.

Ratings for picnic areas are based on soil features only and do not include other features, such as presence of trees or lakes which may affect the desirability of a site. Suitability of the soil for supporting vegetation is a separate item to be considered in the final evaluation of sites. Items considered in establishing ratings are wetness hazard, flooding hazard, slope, surface texture of the soil, and stoniness or rockiness.

Ratings for playgrounds apply to areas to be developed for playgrounds and organized games, such as baseball, football, and badminton. The sites are subject to intensive foot traffic. Areas selected for this use generally require a nearly level surface, good drainage, and a soil texture and consistence that give a firm surface. The most desirable soil is free of rock outcrops and coarse fragments. It is assumed that good vegetative cover can be established and maintained where needed. Items considered in making evaluations are wetness hazard, flooding hazard, permeability, slope, surface texture of the soil, depth to hard bedrock, stoniness, and content of coarse fragments.

Ratings for paths and trails apply to areas that are to be used for trails, cross-country hiking, bridle paths, and nonintensive uses that allow for random movement of people. It is assumed that these areas are to be used as they occur in nature, and little soil needs to be moved or excavated for the planned recreational use. Ratings are based on soil features only and do not include other items that may be important in the selection of a site for this use. Soils rated as having severe limitations may be best from the natural beauty or use standpoint, but they do require more preparation or maintenance for such use. Items considered in establishing ratings are wetness hazard, flooding hazard, slope, surface texture of the soil, and surface stoniness or rockiness.

Suitability of the soils as sites for farm ponds depends primarily on the seepage rate. The highly plastic soils have a low seepage rate; the coarse-textured soils do not have any binding or sealing characteristics, and they have a high seepage rate. The factors considered for farm pond embankments are those features and qualities of disturbed soils that affect the suitability of the soils for constructing embankments. Both the subsoil and the substratum are evaluated where they are contrasting in character and have significant thickness for use as borrow material. The primary features that affect suitability are stability, compaction characteristics, susceptibility to piping, shrink-swell potential, compacted permeability, compressibility, erosiveness, and gypsum content.

The factors considered for irrigation are those features and qualities of the soils that affect their suitability for crops when irrigated.

The factors considered for terraces and diversions are those features and qualities of the soils that affect their stability or hinder layout and construction.

The factors considered for waterways are susceptibility to erosion, depth to bedrock, and ease in establishing desired plants.

Steel pipe should have a protective coating to retard corrosion when placed in any soil in the county. Corrosivity ratings are given for soils of the county for steel, based on soil conditions at a depth of 4 feet, and for concrete.

Formation and Classification of the Soils

This section explains how soils form and what factors are involved in their formation. It describes briefly the system of soil classification and shows how the soils of Scurry County have been classified.

Factors of Soil Formation

Soil is produced by the action of soil-forming factors on materials deposited or accumulated by geologic agents. The characteristics of the soil at any given point are determined by (1) the physical and mineralogical composition of the parent material; (2) the climate under which the soil material has accumulated and existed since accumulation; (3) the plant and animal life on and in the soil; (4) the relief, or lay of the land; and (5) the length of time the forces of soil development have been active.

Climate and vegetation are active factors of soil genesis. They act on the parent material that has accumulated through the weathering of rocks and slowly change it into a natural body that has genetically related horizons. The effects of climate and vegetation are conditioned by relief. The parent material also affects the kind of profile that can be formed and, in extreme cases, determines it almost entirely. Finally, time is needed for the changing of the parent material into a soil profile. It may be much or little, but some time is always required for horizon differentiation. Usually, a long time is required for the development of distinct horizons.

The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effect of any one unless conditions are specified for the other four. Many of the processes of soil development are unknown.

Parent material

The soils of Scurry County developed in residuum, outwash material, and eolian and alluvial deposits. The upper or surface geologic strata of Scurry County consist of Triassic formations, the Double Mountain Group of the Permian period, and the Seymour Formation of the Quaternary period.[6]

Some of the soils are underlain by a remnant of rock of Cretaceous age that crops out as an abrupt escarpment several hundred feet high. The Cretaceous rocks are mantled with some 15 feet or more of caliche.

The Double Mountain Group occurs below the escarpment. The Seymour Formation also occurs below the escarpment; it overlies the Permian formations. The remaining geologic strata of the county consist of Triassic formations.

The residual soils developed in Triassic and Permian materials. Stamford, Vernon, and Weymouth soils developed over the clayey Triassic red beds; Spade, Cobb, and Latom soils developed in the sandstone material of the Triassic period. Woodward, Quinlan, and Carey soils developed in material from the Permian formations.

The outwash soils developed in clays and sands of late Pliocene or early Pleistocene age. The clayey deposits gave rise to the Abilene, Rowena, and Olton soils. The sandy deposits gave rise to the Miles and Brownfield soils. The eolian deposits gave rise to Tivoli soils. The alluvial soils of the county are very young. An example is the Colorado soils. These soils occur on the flood plains of the major creeks. Some of the lower flood plains are reworked continually, and new sediments are deposited annually.

Climate

Climate has had a definite effect on the development of the soils of Scurry County. Precipitation, temperature, and wind are some of the influencing factors of climate.

The wet climate of past geological ages influenced the deposition of the parent materials. Later, as the soils began to develop, the climate became less humid. The limited rainfall was not enough to leach the minerals from the soils. Most soils have a horizon of calcium carbonate a few feet below the surface. Most of the young soils have lime throughout the horizons.

Summer temperatures are high, and winter temperatures are mild. The high temperatures and low rainfall have limited the accumulation of organic matter in the soils.

Wind has had some effect on soil development in the county. It deposited sand over the preexisting materials. Wind continues to shift the sand, silt, and clay of exposed surfaces.

Living organisms

Plants, burrowing animals, insects, and bacteria are important in the formation of soils. Variations in content of organic matter and nitrogen in the soil and in the supply of plant nutrients, and changes in soil structure and porosity, are among the changes caused by living organisms. Vegetation, dominantly grasses, has affected soil formation in Scurry County more than other living organisms.

Relief

Relief influences soil development through its effect on drainage and runoff. The degree of profile development depends mainly on the average amount of moisture in the soil if other factors are equal. Nearly level soils absorb more moisture and ordinarily have better developed profiles than steeper soils. Furthermore, many of the steeper soils erode almost as fast as they form.

Relief also affects the kind and amount of vegetation on a soil. Slopes facing north and east receive less direct sunlight than those facing south and west and lose less moisture through evaporation. As a result, the vegetation is denser on slopes facing north and east.

Soils that are nearly level or slightly concave are likely to have a darker color than sloping soils, because they receive more moisture, produce more vegetation, and contain more organic matter. The organic matter in the soil imparts a dark color.

Time

Time is required for the formation of soils that have distinct horizons. The differences in length of time that

[6] SELLARDS, E.H., ADKINS, W.S., and PLUMMER, F.B., THE GEOLOGY OF TEXAS. Univ. of Tex. Bul. 3232, v. 1, 1,007 pp., illus. 1954.

parent materials have been in place reflect the degree of development of the soil profile. The soils of Scurry County range from young to old. The young soils have very little profile development, and the older soils have well-expressed soil horizons. The bottom-land soils are examples of young soils that lack development.

Soils that have been in place for long periods and that occur in nearly level to gently sloping areas normally show the greatest profile development.

Many shallow, steep soils have been in the process of development as long as the well-developed, nearly level soils. On these soils, geologic erosion has removed the soil material nearly as fast as it has formed. In these places relief is the dominant soil-forming factor, rather than time.

Processes of Soil Horizon Differentiation

Several processes were involved in the formation of soil horizons in the soils of Scurry County. These processes are (1) accumulation of organic matter, (2) leaching of calcium carbonates and bases, and (3) formation and translocation of silicate clay materials. In most soils more than one of these processes have been active in the development of horizons.

Accumulation of organic matter in the upper part of the profile to form an A1 horizon has been important.

Leaching of carbonates and bases has occurred in nearly all the soils. Leaching of bases in soils usually precedes translocation of silicate clay minerals. Most of the soils of this county are weakly to strongly leached, and this has contributed to the development of horizons. In some of the soils, the translocation of clay minerals has contributed to horizon development. In these soils the B horizon generally has an accumulation of clay (clay films) in pores and on ped surfaces.

Classification of the Soils

The current system of soil classification was adopted for general use by the National Cooperative Soil Survey in 1965 and supplemented in March 1967 and September 1968.[7] This system is under continual study, and readers interested in the development of the system should refer to available literature.[8]

Table 5 shows the classification of each of the soil series represented in Scurry County, according to the comprehensive system. Placement of some of the soil series in this system, particularly in families, may change as more precise information becomes available. Some of the soils in this county do not fit in a series that has been recognized in the classification system, but recognition of a separate series would not serve a useful purpose. Such soils are named for series they strongly resemble because they differ from those series in ways too small to be of consequence in interpreting their usefulness or behavior. Soil scientists designate such soils as taxadjuncts to the series for which they are named. In this survey, soils named in the Brownfield, Carey, Lea, and Olton series are taxadjuncts to those series.

The current system defines classes in terms of observable or measurable properties of soils. The properties chosen are primarily those that permit the grouping of soils that are similar in genesis. The classification is designed to encompass all soils. It has six categories. Beginning with the most inclusive, these are the order, the suborder, the great group, the subgroup, the family, and the series.[9] These are briefly defined in the following paragraphs.

ORDER.—Ten soil orders are recognized: Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols, Ultisols, Oxisols, and Histosols. The properties used to differentiate the soil orders are generally those that tend to give broad climatic groupings of soils. Entisols and Histosols are exceptions; they occur in many different climates.

Six of the 10 soil orders are represented in Scurry County: Alfisols, Aridisols, Entisols, Inceptisols, Mollisols, and Vertisols. Alfisols have a clay-enriched B horizon and a base saturation of more than 35 percent. Aridisols are primarily soils of dry places. They have a dark-colored surface layer, and some have a clay-enriched B horizon high in base saturation. Entisols are recent soils in which there has been little, if any, horizon development. Inceptisols occur mostly on young land surfaces. Mollisols have a thick, dark-colored surface layer, moderate to strong structure, and a base saturation of more than 50 percent. Vertisols are soils in which natural churning or inversion of soil material takes place, mainly through the swelling and shrinking of clays.

SUBORDER.—Each order is divided into suborders, primarily on the basis of characteristics that indicate genetic similarity. Mainly, these are characteristics that reflect either the presence or absence of waterlogging or soil differences resulting from the climate or vegetation. The climatic range is narrower than that of the orders.

GREAT GROUP.—Each suborder is divided into great groups, on the basis of uniformity in the kinds and sequence of major horizons and similarity of the significant features of corresponding horizons. The horizons considered are those in which clay, iron, or humus has accumulated and those that have pans that interfere with the growth of roots or the movement of water. The features selected are the self-mulching properties of clays, soil temperature, chemical composition (mainly calcium, magnesium, sodium, and potassium), and the like.

SUBGROUP.—Each great group is divided into subgroups, one representing the central (typic) segment of the group, and other groups, called intergrades, that have properties of one great group and also one or more properties of another great group, suborder, or order. Subgroups may also be made in those instances where soil properties intergrade outside the range of any other great group, suborder, or order.

FAMILY.—Families are established within a subgroup primarily on the basis of properties that affect the growth of plants or the behavior of soils in engineering

[7] UNITED STATES DEPARTMENT OF AGRICULTURE. SOIL CLASSIFICATION, A COMPREHENSIVE SYSTEM, 7TH APPROXIMATION. 265 pp., illus. (Amendments issued in March 1967 and September 1968) 1960.

[8] SIMONSON, ROY W. SOIL CLASSIFICATION IN THE UNITED STATES. Science, v. 137, No. 3535, pp. 1027–1034. 1962.

[9] UNITED STATES DEPARTMENT OF AGRICULTURE. SOIL SURVEY MANUAL. USDA Handbook No. 18, 503 pp., illus. 1951.

TABLE 5.—*Classification of soil series of Scurry County*

Series	Family	Subgroup	Order
Abilene	Fine, mixed, thermic	Pachic Argiustolls	Mollisols.
Berda	Fine-loamy, mixed, thermic	Typic Ustochrepts	Inceptisols.
Brownfield [1]	Loamy, mixed, thermic	Arenic Aridic Paleustalfs	Alfisols.
Carey [1]	Fine-silty, mixed, thermic	Typic Argiustolls	Mollisols.
Cobb	Fine-loamy, mixed, thermic	Udic Haplustalfs	Alfisols.
Colorado	Fine-loamy, mixed, calcareous, thermic	Typic Ustifluvents	Entisols.
Drake	Fine-loamy, mixed, calcareous, thermic	Typic Ustorthents	Entisols.
Hilgrave	Loamy-skeletal, mixed, thermic	Aridic Haplustalfs	Alfisols.
Kimbrough	Loamy, mixed, thermic, shallow	Petrocalcic Calciustolls	Mollisols.
Latom	Loamy, mixed, calcareous, thermic	Lithic Ustic Torriorthents	Entisols.
Lea [1]	Fine-loamy, mixed, thermic	Petrocalcic Paleustolls	Mollisols.
Lipan	Fine, montmorillonitic, thermic	Entic Pellusterts	Vertisols.
Mangum	Fine, mixed, calcareous, thermic	Vertic Ustifluvents	Entisols.
Mansker	Fine-loamy, mixed, thermic	Aridic Calciustolls	Mollisols.
Miles	Fine-loamy, mixed, thermic	Udic Paleustalfs	Alfisols.
Olton [1]	Fine, mixed, thermic	Aridic Paleustolls	Mollisols.
Potter	Loamy-carbonatic, thermic, shallow	Ustollic Calciorthids	Aridisols.
Quinlan	Loamy, mixed, thermic, shallow	Typic Ustochrepts	Inceptisols.
Roscoe	Fine, montmorillonitic, thermic	Typic Pellusterts	Vertisols.
Rowena	Fine, mixed, thermic	Vertic Calciustolls	Mollisols.
Slaughter	Clayey, mixed, thermic, shallow	Petrocalcic Paleustolls	Mollisols.
Spade	Coarse-loamy, mixed, thermic	Typic Ustochrepts	Inceptisols.
Spur	Fine-loamy, mixed, thermic	Fluventic Haplustolls	Mollisols.
Stamford	Fine, montmorillonitic, thermic	Typic Chromusterts	Vertisols.
Tivoli	Mixed, thermic	Typic Ustipsamments	Entisols.
Veal	Fine-loamy, mixed, thermic	Typic Ustochrepts	Inceptisols.
Vernon	Fine, mixed, thermic	Typic Ustochrepts	Inceptisols.
Weymouth	Fine-loamy, mixed, thermic	Typic Ustochrepts	Inceptisols.
Woodward	Coarse-silty, mixed, thermic	Typic Ustochrepts	Inceptisols.

[1] These soils are taxadjuncts to their respective series. They are outside the defined range for the series in the following respects: Brownfield soils have less clay than is typical within a depth of 60 inches; Carey soils do not have mollic epipedons; the solum of the Lea soils is less than 20 inches thick; and the solum of the Olton soils is less than 60 inches thick.

use. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, thickness of horizons, and consistence.

SERIES.—The series is a group of soils that have major horizons that, except for texture of the surface layer, are similar in important characteristics and in arrangement in the profile.

General Nature of the County

This section was prepared mainly for those not familiar with the county. It discusses the history and climate of the county and also the physiography, relief, and drainage.

History

Scurry County was established in 1876. Before that time, it was a part of the Bexar Territory. The first permanent settlers came in 1878 and built homes in the area now known as Camp Springs. In 1884 the town of Snyder became the county seat. In 1900 the population of Snyder was nearly 2,000.

The coming of the railroad early in the 1900's brought more opportunities for trade. Cotton gins and stores were built. Snyder grew slowly until the oil boom of 1948. At that time the population was 4,100, and the economy was based on cotton and cattle. By 1960 the population of Snyder had reached 13,850.

Other trading centers in the county are Hermleigh, Ira, and Fluvanna. The total population of Scurry County in 1960 was 20,369.

Climate [10]

Scurry County has a warm-temperate climate characterized by dry winters and long, humid summers. It lies in the transitional zone between the dry steppe climate of the High Plains and the continuously humid climate of central and eastern Texas. The average annual precipitation is 19.33 inches. Eighty percent of this amount falls, on an average, during the warmer months of the year, April through October. Thundershowers are the predominant form of rainfall, which results in wide variation in amount from year to year and from place to place. In the drought years of the 1950's, rainfall was below average 6 years in succession (1951–1956). From 1957 through 1963 there were 5 years of above-average rainfall and 2 years of below-average rainfall. Almost five times as much rain was received in 1941 as in 1951. Much of the rainfall during exceptionally wet months or years falls as heavy downpours of short duration and results in rapid runoff. Once in 10 years, on an average, less than 11 inches of rainfall can be expected. As much as 24 inches, on the other hand, can also be expected 1 year in 10. Table 6 gives temperature and precipitation data for the county.

[10] By ROBERT B. ORTON, climatologist for Texas, National Weather Service, U.S. Department of Commerce.

TABLE 6.—*Temperature*

[Data from Snyder, elevation 2,325

Month	Temperature						
	Average			Maximum [1]		Minimum [1]	
	Daily maximum	Daily minimum	Monthly	90° F. or above	32° F. or below	32° F. or below	0° F. or below
	°F.	°F.	°F.	Days	Days	Days	Days
January	56.0	26.8	41.4	0	2	25	(2)
February	61.0	30.3	45.7	0	1	16	0
March	68.5	36.9	52.7	(2)	1	11	0
April	78.6	47.4	63.0	6	0	1	0
May	85.8	57.5	71.7	13	0	0	0
June	89.8	66.5	80.2	22	0	0	0
July	96.5	68.6	82.5	27	0	0	0
August	95.5	67.8	82.3	28	0	0	0
September	88.3	60.4	74.7	19	0	0	0
October	83.4	49.6	64.6	6	0	(2)	0
November	68.2	35.9	50.9	0	0	10	0
December	49.1	29.3	43.9	0	1	23	0
Year	77.0	48.1	62.8	121	5	86	(2)

[1] Average length of record 10 years.

Rapid temperature changes occur in winter when surges of cold polar air are frequent. Winters are relatively mild, however, and periods of cold weather are of short duration. High daytime temperatures prevail for a long period in summer. July is the hottest month. It has an average daily maximum of 96.5° F. Despite the high daytime temperatures, most summer nights are comfortable and have a low temperature in the upper 60's.

Prevailing winds are southerly to southeasterly. The strongest sustained winds occur late in winter and early in spring and are associated with deep low-pressure centers over the Texas and Oklahoma panhandles. These systems sometimes produce severe duststorms in the general area.

Violent thunderstorms late in spring and early in summer are sometimes accompanied by strong, gusty winds, hail, and excessive downpours. These occur most frequently in May.

The average annual relative humidity is about 76 percent at 6 a.m., and about 43 percent at 6 p.m.

The average annual evaporation from a standard National Weather Service pan is approximately 103 inches. The average annual lake evaporation is about 71 inches. Approximately 66 percent of the average annual evaporation occurs during the period May through October.

The average freeze-free period in Scurry County is 214 days. The average date of the last 32° freeze in spring is April 4, and the average date of the first freeze in fall is November 4. Chances that a freeze will occur after April 15 or before October 30 are about one in five.

Physiography, Relief, and Drainage

Scurry County is in the southern part of the Great Plains area and in the southwestern part of the Rolling Plains of Texas. The relief is nearly level to hilly.

The elevation of Scurry County ranges from about 2,262 feet in the southeastern corner to about 2,838 feet north of Fluvanna. The elevation at Snyder is 2,325 feet.

Scurry County slopes gradually from west to east, and the drainage is dominantly eastward through Bull Creek, Deep Creek, Rough Creek, and the Colorado River. The drainage in the northern and eastern parts of the county is into the Brazos River in Kent and Fisher Counties. The drainage in the southern and western parts of the county is into the Colorado River.

Except in a few concave playas where drainage is slow, the surface drainage of the county is well developed. Only small areas of bottom land are outside the river and creek channels. During heavy rains the wide channels of the larger streams can carry most of the floodwaters. Some small overflow areas are scattered along the creeks. Except during floods, the streams have very little water. Most of the smaller tributaries do not carry water the entire year. There are a few springs in some of the creeks.

Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as crumbs, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available water capacity (also termed available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Buried soil. A developed soil, once exposed but now overlain by more recently formed soil.

Calcareous soil. A soil containing enough calcium carbonate (often with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid.

and precipitation data

feet. Period of record 1934 through 1963]

Precipitation							
Average total	One year in 10 will have less than—	One year in 10 will have more than—	Average number of days with [1]—			Snow or sleet	
			0.10 inch or more	0.50 inch or more	1 inch or more	Average total	Maximum total
Inches	*Inches*	*Inches*				*Inches*	*Inches*
0. 67	0	1. 55	2	(2)	0	0. 8	9. 1
. 66	0	1. 84	2	(2)	0	1. 1	7. 8
. 78	0. 02	1. 61	2	(2)	0	. 3	3. 0
1. 41	. 28	3. 22	3	1	(2)	. 1	2. 0
3. 51	. 79	6. 64	4	2	1	0	0
2. 48	. 30	5. 38	5	2	1	0	0
2. 54	. 17	6. 04	4	2	1	0	0
1. 51	. 12	3. 00	2	1	(2)	0	0
1. 99	0	3. 59	3	1	(2)	0	0
2. 05	. 24	3. 70	4	2	1	0	0
1. 02	0	2. 63	2	1	(2)	. 1	3. 5
. 71	0	1. 50	2	(2)	0	. 8	5. 8
19. 33	10. 78	24. 14	35	12	4	3. 2	9. 1

[2] Less than half a day.

Caliche. A more or less cemented deposit of calcium carbonate in many soils of warm-temperature areas, as in the Southwestern States. The material may consist of soft, thin layers in the soil or of hard, thick beds just beneath the solum, or it may be exposed at the surface by erosion.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of clay on the surface of a soil aggregate. Synonyms: clay coat, clay skin.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentration of compounds, or of soil grains cemented together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Dune. A mound or ridge of loose sand piled up by the wind.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Flood plain. Nearly level land, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

Gravel. A soil separate made up of pebbles, rounded or angular, that have a diameter ranging from 2.0 to 80 millimeters. The content of gravel is not used in determining the textural class of the soil.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

0 horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an 0 horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Hummocky. Irregular and choppy relief marked by small dunes or mounds that are 3 to 10 feet high and have slopes that range from 3 to 8 percent.

Munsell notation. A system for designating color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with a hue of 10YR, a value of 6, and a chroma of 4.

Outwash. A mantle of soil material, a few feet to 60 feet or more thick, that was washed from areas in the High Plains and Rocky Mountains by streams of meltwater and deposited on the Permian red beds during glacial times.

Parent material. Disintegrated and partly weathered rock from which soil has formed.

Permeability. The quality of a soil horizon that enables water or air to move through it. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline.	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residual material. Unconsolidated, partly weathered mineral material that accumulates over disintegrating solid rock. Residual material is not soil but is frequently the material in which a soil has formed.

Sand. Individual rock or mineral fragments in soils having diameters ranging from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Soil separates. Mineral particles, less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: *Very coarse sand* (2.0 to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.05 to 0.002 millimeter); and *clay* (less than 0.002 millimeter). The separates recognized by the International Society of Soil Science are as follows: I (2.0 to 0.2 millimeter); II (0.2 to 0.02 millimeter); III (0.02 to 0.002 millimeter); IV (less than 0.002 millimeter).

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless soils* are (1) *single grain* (each grain by itself, as in dune sand) or (2) *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Topsoil. A presumed fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Undulating. A relief characterized by successive rolls, or rounded elevations, and depressions.

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. In referring to a capability unit or range site, read the introduction to the section it is in for general information about its management. For information about the use of soils for wildlife, see the section on page 36. Other information is given in tables as follows:

Acreage and extent, table 1, page 4.
Estimated yields, table 2, page 31.

Engineering uses of the soils, tables 3 and 4, pages 38 through 49.

Map symbol	Mapping unit	Page	Capability unit Dryland Symbol	Dryland Page	Irrigated Symbol	Irrigated Page	Range site Name	Range site Page
BeB	Berda loam, 1 to 3 percent slopes	7	IIIe-7	28	------	--	Deep Hardland	33
Br	Brownfield fine sand	8	VIe-7	30	------	--	Deep Sand	34
CaB	Carey loam, 1 to 3 percent slopes	8	IIe-1	26	------	--	Mixedland	34
Co	Colorado and Spur soils	9	Vw-1	30	------	--	Loamy Bottomland	34
DcB	Drake clay loam, 1 to 3 percent slopes	10	IVes-1	30	------	--	Deep Hardland	33
Hg	Hilgrave gravelly fine sandy loam	10	VIs-1	31	------	--	Gravelly	34
La	Latom soils	11	VIIs-1	31	------	--	Very Shallow	36
Lk	Lea-Kimbrough-Slaughter complex	11	IVe-9	30	------	--	Deep Hardland	33
Lp	Lipan clay	12	IVw-1	30	------	--	Deep Hardland	33
Mc	Mangum and Colorado soils	12	VIs-2	31	------	--	Clay Flat	33
MkA	Mansker loam, 0 to 1 percent slopes	13	IIIe-6	28	IIIs-2	29	Deep Hardland	33
MkB	Mansker loam, 1 to 3 percent slopes	13	IIIe-7	28	IIIe-7	28	Deep Hardland	33
MkC	Mansker loam, 3 to 5 percent slopes	13	IVe-2	29	IVe-5	29	Deep Hardland	33
Mp	Mansker-Potter complex	13	VIe-2	30	------	--	Very Shallow	36
MrA	Miles fine sandy loam, 0 to 1 percent slopes	14	IIIe-4	27	IIe-4	26	Sandy Loam	35
MsB	Miles and Cobb fine sandy loams, 1 to 3 percent slopes	14	IIIe-4	27	IIe-5	27	Sandy Loam	35
MsC	Miles and Cobb fine sandy loams, 3 to 5 percent slopes	15	IVe-4	29	IIIe-3	27	Sandy Loam	35
MuB	Miles loamy fine sand, 0 to 3 percent slopes	15	IVe-6	29	IIIe-6	28	Sandyland	35
OcA	Olton clay loam, 0 to 1 percent slopes	15	IIce-4	27	I-1	25	Deep Hardland	33
OcB	Olton clay loam, 1 to 3 percent slopes	16	IIIe-2	27	IIe-1	26	Deep Hardland	33
OlA	Olton loam, 0 to 1 percent slopes	16	IIce-4	27	I-1	25	Deep Hardland	33
OlB	Olton loam, 1 to 3 percent slopes	16	IIIe-2	27	IIe-1	26	Deep Hardland	33
Pt	Potter soils	16	VIIs-1	31	------	--	Very Shallow	36
Qu	Quinlan soils	17	VIe-4	30	------	--	Mixedland	34
Rc	Roscoe clay	17	IIIw-1	29	------	--	Deep Hardland	33
Ro	Rough broken and stony land	17	VIIs-2	31	------	--	Rough Broken	35
RwA	Rowena-Abilene complex, 0 to 1 percent slopes	19	IIce-4	27	I-1	25	Deep Hardland	33
RwB	Rowena-Abilene complex, 1 to 3 percent slopes	19	IIIe-2	27	IIe-1	26	Deep Hardland	33
SlB	Spade-Latom fine sandy loams, 1 to 3 percent slopes	20	IVe-5	29	------	--	Sandy Loam	35
SlC	Spade-Latom fine sandy loams, 3 to 5 percent slopes	20	VIe-2	30	------	--	Sandy Loam	35
Sp	Spur clay loam	20	IIce-1	27	I-2	26	Loamy Bottomland	34
Sr	Spur fine sandy loam	20	IIIe-4	27	------	--	Loamy Bottomland	34
StA	Stamford clay, 0 to 1 percent slopes	21	IIIs-2	28	IIIs-1	28	Clay Flat	33
StB	Stamford clay, 1 to 3 percent slopes	21	IVe-8	30	------	--	Clay Flat	33
Tv	Tivoli fine sand	21	VIIe-1	31	------	--	Deep Sand	34
VaB	Veal fine sandy loam, 1 to 3 percent slopes	22	IIIe-8	28	IIIe-7	28	Sandy Loam	35
VaC	Veal fine sandy loam, 3 to 5 percent slopes	22	IVe-5	29	IVe-5	29	Sandy Loam	35
VcB	Vernon clay, 1 to 3 percent slopes	22	IVe-7	30	------	--	Shallow Redland	36
VcC	Vernon clay, 3 to 5 percent slopes	23	VIe-1	30	------	--	Shallow Redland	36
Vd	Vernon-Badland complex	23	VIIs-2	31	------	--	Shallow Redland	36
Vp	Vernon-Potter complex	23	VIe-2	30	------	--	Shallow Redland	36
WvB	Weymouth-Vernon clay loams, 1 to 3 percent slopes	24	IVe-7	30	------	--	Shallow Redland	36
WvC	Weymouth-Vernon clay loams, 3 to 5 percent slopes	24	VIe-1	30	------	--	Shallow Redland	36
WwB	Woodward loam, 1 to 3 percent slopes	24	IIe-1	26	------	--	Mixedland	34

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

TEXAS AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP
SCURRY COUNTY, TEXAS

Scale 1:253,440

1 0 1 2 3 4 Miles

SOIL ASSOCIATIONS*

1 Rowena-Abilene-Olton association: Deep, nearly level to gently sloping, well-drained, moderately slowly permeable, loamy soils

2 Miles-Cobb association: Deep and moderately deep, nearly level to gently sloping, well-drained, moderately permeable, loamy soils

3 Mansker-Potter association: Very shallow to deep, nearly level to steep, well-drained, moderately permeable, loamy soils

4 Vernon-Stamford association: Deep, nearly level to steep, well-drained, slowly and very slowly permeable, clayey and loamy soils

5 Quinlan-Broken land association: Shallow, gently sloping to steep, well-drained to excessively drained soils and rough broken and stony land

* Texture in the descriptive heading refers to the surface layer of the major soils.

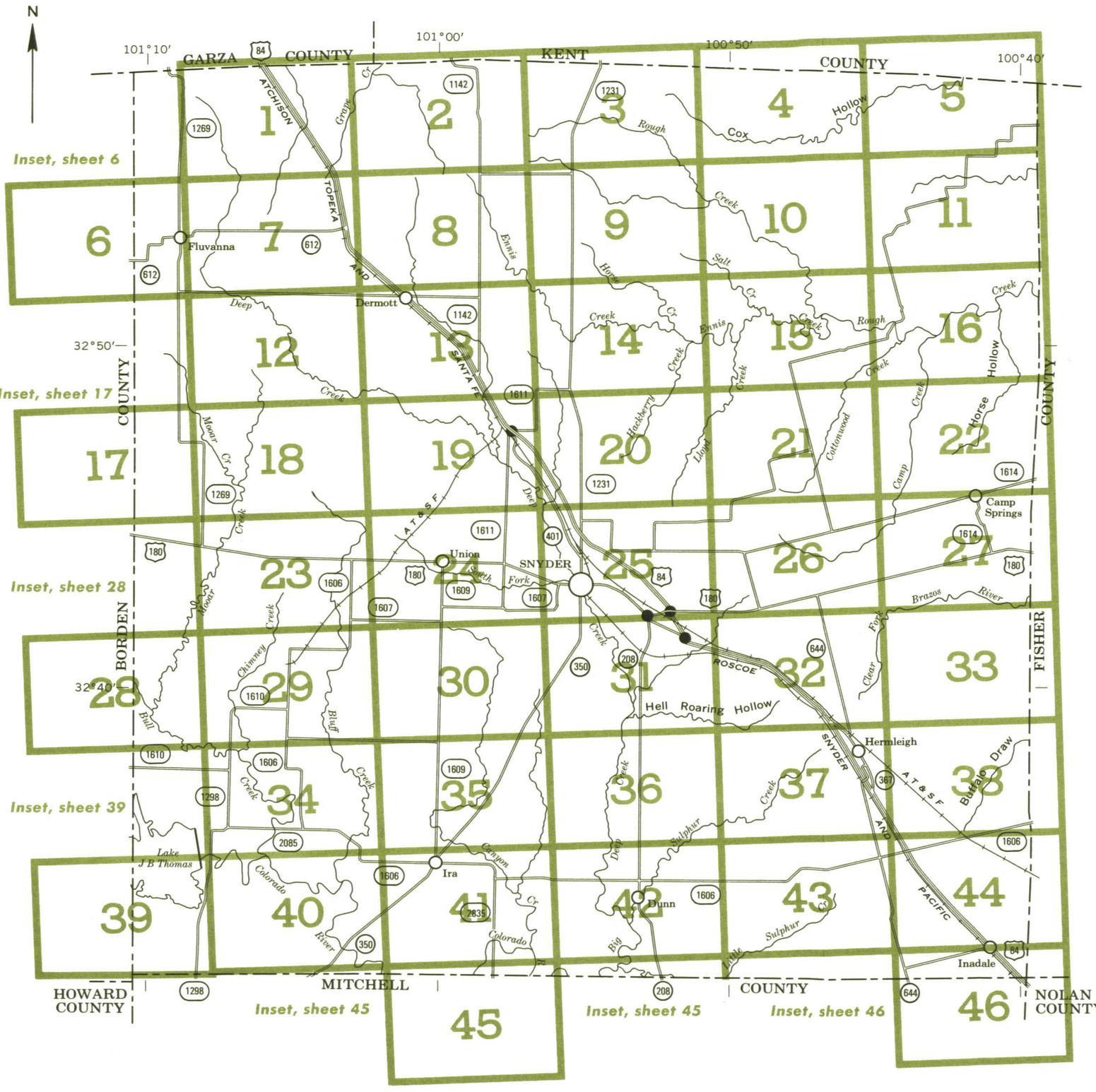
Compiled 1972

This map is for general planning. It shows only the major soils and does not contain sufficient detail for operational planning.

INDEX TO MAP SHEETS
SCURRY COUNTY, TEXAS

Scale 1:253,440

1 0 1 2 3 4 Miles



CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads
- Divided
- Good motor
- Poor motor

Highway markers
- National Interstate
- U. S.
- State or county
- Farm or ranch (1269)

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail
- Railroad
- Ferry (Fy)
- Ford (Ford)
- Grade
- R. R. over
- R. R. under
- Tunnel (Tunnel)

Buildings
- School
- Church

Mine and quarry

Pit, gravel or caliche

Cotton gin

Windmill

Cemetery

Dams

Levee

Fence

BOUNDARIES

- National or state
- County
- Project area
- Reservation
- Land grant
- Small park, cemetery, airport
- Land division corners

DRAINAGE

Streams, double-line
- Perennial
- Intermittent

Streams, single-line
- Perennial
- Intermittent
  - Crossable with tillage implements
  - Not crossable with tillage implements
  - Unclassified

Canals and ditches (CANAL)

Lakes and ponds
- Perennial (water, w)
- Intermittent (int)

Spring

Marsh or swamp

Wet spot

Drainage end

SOIL SURVEY DATA

- Soil boundary and symbol (Dx)
- Gravel
- Stony Very stony
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Sandy areas
- Gumbo or scabby spot
- Made land
- Severely eroded spot
- Blowout, wind erosion
- Gully
- Kitchen midden
- Landslide or slip
- Detrimental deposit
- Soil sample site (S)

RELIEF

Escarpments
- Bedrock
- Other

Prominent peak

Depressions, unclassified (Large, Small)

SOIL LEGEND

The first capital letter is the initial one of the soil name. A second capital letter, A, B, or C, shows the slope. Most symbols without a slope letter are those of nearly level soils, but some are for soils or land types that have a considerable range of slope. (W) following the soil name indicates that signs of erosion, especially of local shifting of soil by wind, are evident in places, but the degree of erosion cannot be estimated reliably.

SYMBOL	NAME
BeB	Berda loam, 1 to 3 percent slopes
Br	Brownfield fine sand (W)
CaB	Carey loam, 1 to 3 percent slopes
Co	Colorado and Spur soils
DcB	Drake clay loam, 1 to 3 percent slopes
Hg	Hilgrave gravelly fine sandy loam
La	Latom soils
Lk	Lea-Kimbrough-Slaughter complex
Lp	Lipan clay
Mc	Mangum and Colorado soils
MkA	Mansker loam, 0 to 1 percent slopes
MkB	Mansker loam, 1 to 3 percent slopes
MkC	Mansker loam, 3 to 5 percent slopes
Mp	Mansker-Potter complex
MrA	Miles fine sandy loam, 0 to 1 percent slopes (W)
MsB	Miles and Cobb fine sandy loams, 1 to 3 percent slopes (W)
MsC	Miles and Cobb fine sandy loams, 3 to 5 percent slopes (W)
MuB	Miles loamy fine sand, 0 to 3 percent slopes (W)
OcA	Olton clay loam, 0 to 1 percent slopes
OcB	Olton clay loam, 1 to 3 percent slopes
OlA	Olton loam, 0 to 1 percent slopes
OlB	Olton loam, 1 to 3 percent slopes
Pt	Potter soils
Qu	Quinlan soils
Rc	Roscoe clay
Ro	Rough broken and stony land
RwA	Rowena-Abilene complex, 0 to 1 percent slopes
RwB	Rowena-Abilene complex, 1 to 3 percent slopes
SlB	Spade-Latom fine sandy loams, 1 to 3 percent slopes (W)
SlC	Spade-Latom fine sandy loams, 3 to 5 percent slopes (W)
Sp	Spur clay loam
Sr	Spur fine sandy loam
StA	Stamford clay, 0 to 1 percent slopes
StB	Stamford clay, 1 to 3 percent slopes
Tv	Tivoli fine sand (W)
VaB	Veal fine sandy loam, 1 to 3 percent slopes (W)
VaC	Veal fine sandy loam, 3 to 5 percent slopes (W)
VcB	Vernon clay, 1 to 3 percent slopes
VcC	Vernon clay, 3 to 5 percent slopes
Vd	Vernon-Badland complex
Vp	Vernon-Potter complex
WvB	Weymouth-Vernon clay loams, 1 to 3 percent slopes
WvC	Weymouth-Vernon clay loams, 3 to 5 percent slopes
WwB	Woodward loam, 1 to 3 percent slopes

SCURRY COUNTY, TEXAS — SHEET NUMBER 1

493 000 FEET

882 000 FEET

GARZA COUNTY

BLUE MOUNTAIN

FLAT TOP MOUNTAIN

CALICHE PIT

ATCHISON TOPEKA AND SANTA FE

Dyer Creek

(Joins inset, sheet 6)

(Joins sheet 2)

(Joins sheet 7)

912 000 FEET

473 000 FEET

N

2 Miles

10000 Feet

Scale 1:24000

1 5000

0 0

¼ 1000

½ 2000

¾ 3000

1 4000

1¼ 5000

SCURRY COUNTY, TEXAS NO. 1

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station. Land division corners are approximately positioned on this map.

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

SCURRY COUNTY, TEXAS — SHEET NUMBER 2

N

493 000 FEET

942 000 FEET

GARZA COUNTY

KENT COUNTY

Grape Creek

87

1742

1142

605 606 607 608 609 610

656 657 658 659 660

567 568 569 570 571 572

Scale 1:24000

2 Miles 10000 Feet

1 5000

0 0 1000 2000 3000 4000 5000

912 000 FEET

473 000 FEET

(Joins sheet 1)

(Joins sheet 3)

(Joins sheet 8)

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.

SCURRY COUNTY, TEXAS NO. 2

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

SCURRY COUNTY, TEXAS — SHEET NUMBER 3

493 000 FEET

942 000 FEET

KENT COUNTY

Rough Creek

Gas Plant

Hollow

655 654 653 652 651 650

611 612 613 614 615 616

566 565 564 563 562 561

1231

(Joins sheet 2)

(Joins sheet 4)

(Joins sheet 9)

972 000 FEET

473 000 FEET

N

2 Miles

10000 Feet

Scale 1:24000

5000

0

1000

2000

3000

4000

5000

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

SCURRY COUNTY, TEXAS NO. 3

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station. Land division corners are approximately positioned on this map.

SCURRY COUNTY, TEXAS — SHEET NUMBER 4

4

N

493 000 FEET

1 002 000 FEET

KENT COUNTY

Hollow

Cox

Hollow

Qu Ro WvB OcA StB OcB Vp Vd Co WwB OlB La CaB

649 648 647 646 645 617 618 619 620 623 560 559 558 621 622

(Joins sheet 3)

(Joins sheet 5)

(Joins sheet 10)

2 Miles

10000 Feet

1 5000

Scale 1:24000

0 0 1000 2000 3000 4000 5000

¼ ½ ¾ 1

972 000 FEET

473 000 FEET

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

Land division corners are approximately positioned on this map.

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SCURRY COUNTY, TEXAS NO. 4

SCURRY COUNTY, TEXAS — SHEET NUMBER 5

493 000 FEET

1 002 000 FEET

KENT COUNTY

Hollow

Cox

Canyon

Aleck

Red

Branch

Goldstens

FISHER COUNTY

59 58 57 56 55 644 625 627 628 629 632 633

Qu Ro OcA OcB WvB WwB CaB

(Joins sheet 4)

(Joins sheet 11)

1 032 500 FEET

473 000 FEET

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

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SCURRY COUNTY, TEXAS NO. 5

5

N

Scale 1:24000

2 Miles 10000 Feet

1 5000

0 1000 2000 3000 4000 5000

6

N

2 Miles

10000 Feet

1 5000

Scale 1:24000

0 0 1000 2000 3000 4000 5000

493 000 FEET

882 000 FEET

GARZA COUNTY

BORDEN COUNTY

BLUE MOUNTAIN

CALICHE PIT

StA Mp BeB Ro WvB OcA Lk RwA OcB MkB RwB Rc Pt Sp Lp

668 598 599 579 578 536 537

(Joins sheet 1)

872 000 FEET

473 000 FEET

(Joins upper right)

(Joins inset)

473 000 FEET

882 000 FEET

517 516 1268 482 483 612 Fluvanna 1289 468 462 426 427

(Joins sheet 7)

453 000 FEET

(Joins sheet 17)

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.

SCURRY COUNTY, TEXAS NO. 6

N

473 000 FEET

882 000 FEET

(Joins sheet 6)

(Joins sheet 8)

(Joins sheet 12)

453 000 FEET

912 000 FEET

Fluvanna

BLUE MOUNTAIN

Deep Creek

Crane Creek

ATCHISON, TOPEKA AND SANTA FE

612

84

Scale 1:24000

2 Miles 1

10000 Feet 5000 0

1 0

¼ 1000

½ 2000

¾ 3000

1 4000

5000

SCURRY COUNTY, TEXAS NO. 7

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station. Land division corners are approximately positioned on this map.

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

SCURRY COUNTY, TEXAS — SHEET NUMBER 8

(8)

N

Scale 1:24000

2 Miles 1 0

10000 Feet 5000 0

1/4 1/2 3/4 1

1000 2000 3000 4000 5000

(Joins sheet 2)

(Joins sheet 7)

(Joins sheet 9)

(Joins sheet 13)

473 000 FEET

942 000 FEET

912 000 FEET

453 000 FEET

543 544 545 546 547 548

510 509 508 507 506 505

489 490 491 492 493 494

455 454 453 452 451

1142

84

CALICHE PIT

ATCHISON TOPEKA AND SANTA FE

DUAL

Ennis Creek

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.

SCURRY COUNTY, TEXAS NO. 8

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

SCURRY COUNTY, TEXAS — SHEET NUMBER 9

SCURRY COUNTY, TEXAS NO. 9

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station. Land division corners are approximately positioned on this map.

473 000 FEET

942 000 FEET

(Joins sheet 3)

(Joins sheet 8)

(Joins sheet 10)

(Joins sheet 14)

453 000 FEET

972 000 FEET

9

N

2 Miles

10000 Feet

5000

Scale 1:24000

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

SCURRY COUNTY, TEXAS — SHEET NUMBER 10

(Joins sheet 4)

473 000 FEET

1 002 000 FEET

N

Scale 1:24000

2 Miles 10000 Feet

1 5000 0 1000 2000 3000 4000 5000

(Joins sheet 9)

(Joins sheet 11)

972 000 FEET

453 000 FEET

(Joins sheet 15)

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.

SCURRY COUNTY, TEXAS NO. 10

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

SCURRY COUNTY, TEXAS — SHEET NUMBER 11

11

N

473 000 FEET

1 002 000 FEET

(Joins sheet 5)

(Joins sheet 10)

(Joins sheet 16)

453 000 FEET

1 032 000 FEET

FISHER COUNTY

Red Aleck Canyon

Goldstens Branch

Little Rough Creek

Qu Ro WvB OcA OcB MkB RwA StA OlB WvC WwB Hg CaB OlA

626 730 630 631 634 276 275 247 248 251 252 253 254 250 249 246 245 244 243 242

Scale 1:24000

2 Miles 10000 Feet

1 5000

¾ 4000

½ 3000

¼ 2000

0 1000 0

SCURRY COUNTY, TEXAS NO. 11

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.
Land division corners are approximately positioned on this map.

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

SCURRY COUNTY, TEXAS — SHEET NUMBER 12

12

N

Scale 1:24000

2 Miles 1 0 1

10000 Feet 5000 0 1000 2000 3000 4000 5000

(Joins sheet 7)

(Joins inset, sheet 17)

(Joins sheet 17)

(Joins sheet 18)

(Joins sheet 13)

453 000 FEET

912 000 FEET

882 000 FEET

433 000 FEET

RwB RwA Rc MkB Sp Pt Lp MkA MkC OIB OcB OcA WvB Mc Vp VcC VcB

Deep Creek

Mopar Draw

Co

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.

SCURRY COUNTY, TEXAS NO. 12

SCURRY COUNTY, TEXAS — SHEET NUMBER 13

453 000 FEET

912 000 FEET

(Joins sheet 8)

(Joins sheet 12)

(Joins sheet 14)

(Joins sheet 19)

942 000 FEET

433 000 FEET

13

N

Scale 1:24000

2 Miles 1 0

10000 Feet 5000 0

SCURRY COUNTY, TEXAS NO. 13

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.
Land division corners are approximately positioned on this map.

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

SCURRY COUNTY, TEXAS — SHEET NUMBER 14

14

N

(Joins sheet 9)

453 000 FEET

972 000 FEET

Scale 1:24000

2 Miles 1 0

10000 Feet 5000 0

¼ ½ ¾ 1

1000 2000 3000 4000 5000

(Joins sheet 13)

(Joins sheet 15)

942 000 FEET

433 000 FEET

(Joins sheet 20)

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.

SCURRY COUNTY, TEXAS NO. 14

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

SCURRY COUNTY, TEXAS — SHEET NUMBER 15

15

N

453 000 FEET

972 000 FEET

(Joins sheet 10)

(Joins sheet 14)

(Joins sheet 16)

(Joins sheet 21)

1 002 000 FEET

433 000 FEET

Scale 1:24000

2 Miles 1 0

10000 Feet 5000 0

1 5000

¾ 4000

½ 3000

¼ 2000

0 1000

0

SCURRY COUNTY, TEXAS NO. 15

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.
Land division corners are approximately positioned on this map.

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

16

SCURRY COUNTY, TEXAS — SHEET NUMBER 16

N

Scale 1:24000

2 Miles 1 0

10000 Feet 5000 0

1 5000

¾ 4000 1000

½ 3000 2000

¼ 0 1000

453 000 FEET

1 032 000 FEET

1 002 000 FEET

433 000 FEET

(Joins sheet 11)

(Joins sheet 15)

(Joins sheet 22)

ROUGH CREEK

Cottonwood Creek

Turkey Creek

Camp Creek

Horse Hollow

GREEN MOUNTAIN

FISHER COUNTY

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.

SCURRY COUNTY, TEXAS NO. 16

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

SCURRY COUNTY, TEXAS — SHEET NUMBER 17

17

N

Scale 1:24000

2 Miles 1 0 10000 Feet 5000 0

1 ¼ ½ ¾ 1

5000 4000 3000 2000 1000 0

SCURRY COUNTY, TEXAS NO. 17

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.
Land division corners are approximately positioned on this map.

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

SCURRY COUNTY, TEXAS — SHEET NUMBER 18

18

N

Scale 1:24000

2 Miles 1 0 1

10000 Feet 5000 0 5000

(Joins sheet 12)

(Joins sheet 17)

(Joins sheet 19)

(Joins sheet 23)

433 000 FEET

912 000 FEET

882 000 FEET

413 000 FEET

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.

SCURRY COUNTY, TEXAS NO. 18

SCURRY COUNTY, TEXAS NO. 19

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.
Land division corners are approximately positioned on this map.

433 000 FEET

912 000 FEET

(Joins sheet 13)

(Joins sheet 18)

(Joins sheet 20)

(Joins sheet 24)

942 000 FEET

413 000 FEET

19

N

2 Miles

10000 Feet

5000

1:24000

Scale 1:24000

0 1000 2000 3000 4000 5000

Brand

Deep Creek

GRAVEL PIT

ATCHISON, TOPEKA AND SANTA FE

DUAL

1611

84

401

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

SCURRY COUNTY, TEXAS — SHEET NUMBER 20

20

N

433 000 FEET

972 000 FEET

(Joins sheet 14)

(Joins sheet 19)

(Joins sheet 21)

(Joins sheet 25)

413 000 FEET

942 000 FEET

SNYDER
(county seat)

Scale 1:24000

2 Miles 1 0 0 1000 2000 3000 4000 5000 Feet

10000 Feet

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station

SCURRY COUNTY, TEXAS NO. 20

SCURRY COUNTY, TEXAS — SHEET NUMBER 21

21

N

433 000 FEET

972 000 FEET

(Joins sheet 15)

(Joins sheet 20)

(Joins sheet 22)

(Joins sheet 26)

1 002 000 FEET

413 000 FEET

LLOYD MOUNTAIN

Lloyd Creek

Cottonwood Creek

Rockwall Creek

Scale 1:24000

2 Miles 10000 Feet

1 5000

0 0 1000

¼ 2000

½ 3000

¾ 4000

1 5000

SCURRY COUNTY, TEXAS NO. 21

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station. Land division corners are approximately positioned on this map.

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

22

SCURRY COUNTY, TEXAS — SHEET NUMBER 22

N

(Joins sheet 16)

433 000 FEET

1 032 000 FEET

Scale 1:24000

2 Miles 10000 Feet

1 5000

0 0 1000

¼ 2000

½ 3000

¾ 4000

1 5000

1 002 000 FEET

413 000 FEET

(Joins sheet 21)

(Joins sheet 27)

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.

SCURRY COUNTY, TEXAS NO. 22

FISHER COUNTY

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

SCURRY COUNTY, TEXAS — SHEET NUMBER 23

SCURRY COUNTY, TEXAS NO. 23

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station. Land division corners are approximately positioned on this map.

413 000 FEET

882 000 FEET

(Joins sheet 18)

(Joins inset, sheet 28)

(Joins sheet 24)

(Joins sheet 29)

912 000 FEET

393 000 FEET

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

23

N

2 Miles

10000 Feet

Scale 1:24000

SCURRY COUNTY, TEXAS — SHEET NUMBER 24

(Joins sheet 19)

413 000 FEET

942 000 FEET

N

2 Miles

10000 Feet

Scale 1:24000

1 5000

0 0

1/4 1000

1/2 2000

3/4 3000

1 4000

1 1/4 5000

912 000 FEET

393 000 FEET

(Joins sheet 23)

(Joins sheet 25)

(Joins sheet 30)

Union

Refinery

CALICHE PIT

ATCHISON AND SANTA FE TOPEKA

South Fork Deep Creek

246 247 248 249 250

212 211 210 209 208

203 204 205 206 207

194 193 192 191

1609 1611 1607 180

MkB MkC MsB VaB OcB OcA OIB OIA RwB RwA MrA VaC Sp Pt Rc Co Tp

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.

SCURRY COUNTY, TEXAS NO. 24

SCURRY COUNTY, TEXAS — SHEET NUMBER 25

413 000 FEET

942 000 FEET

(Joins sheet 20)

(Joins sheet 24)

(Joins sheet 26)

(Joins sheet 31)

393 000 FEET

972 000 FEET

SNYDER
(county seat)

SNYDER CEMETERY

Deep Creek

Lloyd Creek

South Fork Deep Creek

ATCHISON TOPEKA AND SANTA FE

ROSCOE SNYDER AND PACIFIC

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone

SCURRY COUNTY, TEXAS NO. 25

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station. Land division corners are approximately positioned on this map.

25

N

Scale 1:24000

2 Miles

10000 Feet

1 5000

SCURRY COUNTY, TEXAS — SHEET NUMBER 26

(Joins sheet 21)

413 000 FEET

1 002 000 FEET

N

2 Miles 10000 Feet

1 5000

Scale 1:24000

0 1000 2000 3000 4000 5000

(Joins sheet 25)

(Joins sheet 27)

972 000 FEET

393 000 FEET

(Joins sheet 32)

Plainview

Coloma wood Cr.

Camp Creek

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.

SCURRY COUNTY, TEXAS NO. 26

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

SCURRY COUNTY, TEXAS — SHEET NUMBER 27

27

N

413 000 FEET

1 002 000 FEET

(Joins sheet 22)

(Joins sheet 26)

(Joins sheet 33)

Camp Springs

Midway

Camp Creek

Clear Fork Brazos River

SCURRY COUNTY

FISHER COUNTY

1614

180

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

1 032 000 FEET

393 000 FEET

2 Miles

10000 Feet

5000

Scale 1:24000

SCURRY COUNTY, TEXAS NO. 27

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station. Land division corners are approximately positioned on this map.

SCURRY COUNTY, TEXAS — SHEET NUMBER 28

28

N

Scale 1:24000

2 Miles 1 0 1

10000 Feet 5000 0 5000

1/4 1/2 3/4 1 0 1/4 1/2 3/4 1

1000 2000 3000 4000 5000

(Joins sheet 17)

413 000 FEET

882 000 FEET

(Joins sheet 23)

BORDEN COUNTY

SCURRY COUNTY

County Line Tank

Buff Creek

Mooar Creek

868 500 FEET

393 000 FEET

(Joins upper right)

(Joins inset)

393 000 FEET

882 000 FEET

(Joins sheet 29)

373 000 FEET

(Joins inset, sheet 39)

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.

SCURRY COUNTY, TEXAS NO. 28

SCURRY COUNTY, TEXAS — SHEET NUMBER 29

393 000 FEET

882 000 FEET

(Joins sheet 23)

(Joins sheet 28)

(Joins sheet 30)

(Joins sheet 34)

912 000 FEET

373 000 FEET

29

N

Scale 1:24000

2 Miles 1

10000 Feet 5000

0 0

1/4 1000

2/4 2000

3/4 3000

4/4 4000

5000

SCURRY COUNTY, TEXAS NO. 29

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.
Land division corners are approximately positioned on this map.

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

SCURRY COUNTY, TEXAS — SHEET NUMBER 30

(30)

N

(Joins sheet 24)

393 000 FEET

942 000 FEET

WINSTON AIRPORT

(Joins sheet 29)

912 000 FEET

373 000 FEET

(Joins sheet 35)

(Joins sheet 31)

Creek

Canyon

2 Miles 10000 Feet

1 5000

Scale 1:24000

0 0

¼ 1000

½ 2000

¾ 3000

1 4000

5000

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.

Land division corners are approximately positioned on this map.

SCURRY COUNTY, TEXAS NO. 30

SCURRY COUNTY, TEXAS — SHEET NUMBER 31

31

393 000 FEET

942 000 FEET

(Joins sheet 25)

(Joins sheet 30)

(Joins sheet 32)

(Joins sheet 36)

373 000 FEET

972 000 FEET

N

SNYDER
(county seat)

ROSCOE

SNYDER

ATCHISON TOPEKA AND SANTA FE

AND PACIFIC

Deep Creek

Hell Roaring Hollow

2 Miles

10000 Feet

Scale 1:24000

1 5000

0 0

1/4 1000

1/2 2000

3/4 4000

1 5000

SCURRY COUNTY, TEXAS NO. 31

•This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station. Land division corners are approximately positioned on this map.

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

32

SCURRY COUNTY, TEXAS — SHEET NUMBER 32

(Joins sheet 26)

393 000 FEET

1 002 000 FEET

N

2 Miles

10000 Feet

Scale 1:24000

1 5000

(Joins sheet 31)

(Joins sheet 33)

(Joins sheet 37)

972 000 FEET

373 000 FEET

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.

SCURRY COUNTY, TEXAS NO. 32

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

SCURRY COUNTY, TEXAS NO. 33

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station. Land division corners are approximately positioned on this map.

393 000 FEET

1 002 000 FEET

(Joins sheet 27)

(Joins sheet 32)

(Joins sheet 38)

373 000 FEET

1 032 000 FEET

FISHER COUNTY

N

2 Miles

10000 Feet

Scale 1:24000

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

(Joins sheet 29)

373 000 FEET

912 000 FEET

(Joins sheet 35)

(Joins inset, sheet 39)

882 000 FEET

353 000 FEET

(Joins sheet 40)

N

Scale 1:24000

2 Miles 1 0 10000 Feet 5000 0

1 ¼ ½ ¾ 1 5000 4000 3000 2000 1000 0

Knapp Community Center

Bull Creek

Pt Creek

Bluff Creek

COLORADO RIVER

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

SCURRY COUNTY, TEXAS NO. 34

SCURRY COUNTY, TEXAS — SHEET NUMBER 35

373 000 FEET

912 000 FEET

(Joins sheet 30)

(Joins sheet 34)

(Joins sheet 36)

(Joins sheet 41)

353 000 FEET

942 000 FEET

35

N

2 Miles

10000 Feet

Scale 1:24000

1 5000 0 0

¼ 1000

½ 2000

¾ 3000

1 4000

1¼ 5000

SCURRY COUNTY, TEXAS NO. 35

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.

Land division corners are approximately positioned on this map.

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

SCURRY COUNTY, TEXAS — SHEET NUMBER 36

N

Scale 1:24000

2 Miles — 10000 Feet — 1 — 5000 — 0 — 0 — 1000 — 2000 — 3000 — 4000 — 5000 — 1

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.

SCURRY COUNTY, TEXAS NO. 36

SCURRY COUNTY, TEXAS — SHEET NUMBER 37

373 000 FEET

(Joins sheet 32)

972 000 FEET

(Joins sheet 36)

(Joins sheet 38)

(Joins sheet 43)

353 000 FEET

1 002 000 FEET

HERMLEIGH

ATCHISON, TOPEKA AND SANTA FE

ROSCOE, SNYDER AND PACIFIC

CALICHE PIT

Big Sulphur Creek

Scale 1:24000

2 Miles

10000 Feet

5000

SCURRY COUNTY, TEXAS NO. 37

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station. Land division corners are approximately positioned on this map.

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

SCURRY COUNTY, TEXAS — SHEET NUMBER 38

(Joins sheet 33)

373 000 FEET

1 032 000 FEET

N

2 Miles

10000 Feet

Scale 1:24000

1 002 000 FEET

353000 FEET

(Joins sheet 37)

(Joins sheet 44)

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.

SCURRY COUNTY, TEXAS NO. 38

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

373 000 FEET

868 200 FEET

(Joins sheet 28)

(Joins sheet 34)

(Joins upper right)

353 000 FEET

882 000 FEET

867 300 FEET

(Joins inset)

(Joins sheet 40)

332 700 FEET

LAKE J B THOMAS

DAM

BORDEN COUNTY

MITCHELL COUNTY

1610

1298

Creek

Bull

Br

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

39

N

2 Miles

10000 Feet

1

5000

24000

Scale 1:24000

0 1000 2000 3000 4000 5000

(on 45 inset A)

SCURRY COUNTY, TEXAS — SHEET NUMBER 40

40

N

(Joins sheet 34)

353 000 FEET

912 000 FEET

(Joins sheet 39)

(Joins sheet 41)

882 000 FEET

333 000 FEET

(Joins inset A, sheet 45)

2 Miles

10000 Feet

Scale 1:24000

1 5000 4000

0 0 1000 2000 3000 4000 5000

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.

SCURRY COUNTY, TEXAS NO. 40

SCURRY COUNTY, TEXAS — SHEET NUMBER 41

41

N

353 000 FEET

912 000 FEET

(Joins sheet 35)

(Joins sheet 40)

(Joins sheet 42)

(Joins sheet 45)

942 000 FEET

333 000 FEET

Ira

FORD

COLORADO RIVER

Canyon Creek

Scale 1:24000

2 Miles 1 0 1

10000 Feet 5000 0 5000

SCURRY COUNTY, TEXAS NO. 41

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station

Land division corners are approximately positioned on this map.

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

N

(Joins sheet 36)

353 000 FEET

972 000 FEET

(Joins sheet 41)

(Joins sheet 43)

942 000 FEET

333 000 FEET

(Joins inset B, sheet 45)

Scale 1:24000

2 Miles 1 0

10000 Feet 5000 0

1 ½ 0

5000 4000 3000 2000 1000 0

Dunn

Deep Creek

Sulphur Creek

Wildcat Draw

Big Sulphur Creek

Drg Run

GALICHE PIT

190 191 192 193 145 144 143 142 134 132 136 135 87 88 85 86 66 65 64 63 208 1606

MsB MsC MrA SlB SlC VaB VaC VaA OlA OcB OcA Pt Sp La Co MkB MkA MuB OlB

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.

SCURRY COUNTY, TEXAS NO. 42

SCURRY COUNTY, TEXAS — SHEET NUMBER 43

353 000 FEET

972 000 FEET

(Joins sheet 37)

(Joins sheet 42)

(Joins sheet 44)

(Joins inset, sheet 46)

333 000 FEET

1 002 000 FEET

43

N

2 Miles

10000 Feet

Scale 1:24000

1 0 1 5000 0 1000 2000 3000 4000 5000

SCURRY COUNTY, TEXAS NO. 43

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station. Land division corners are approximately positioned on this map.

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

N

Scale 1:24 000

2 Miles 1 0 10000 Feet

1 0 5000

1/4 0 1000

1/2 0 2000

3/4 0 3000

1 0 4000

1 5000

(Joins sheet 38)

(Joins sheet 43)

(Joins sheet 46)

353 000 FEET

1 032 000 FEET

1 002 000 FEET

333 000 FEET

ATCHISON TOPEKA AND SANTA FE

ROSCOE SNYDER AND PACIFIC

FISHER COUNTY

SCURRY COUNTY

Pyron

Inadale

230 231 234 241 242 243 244 1 2 3 32 33 37 38 39 40 41 22

RwA MkB RwB Rc MkA OcA Co Lp OcB DcB

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

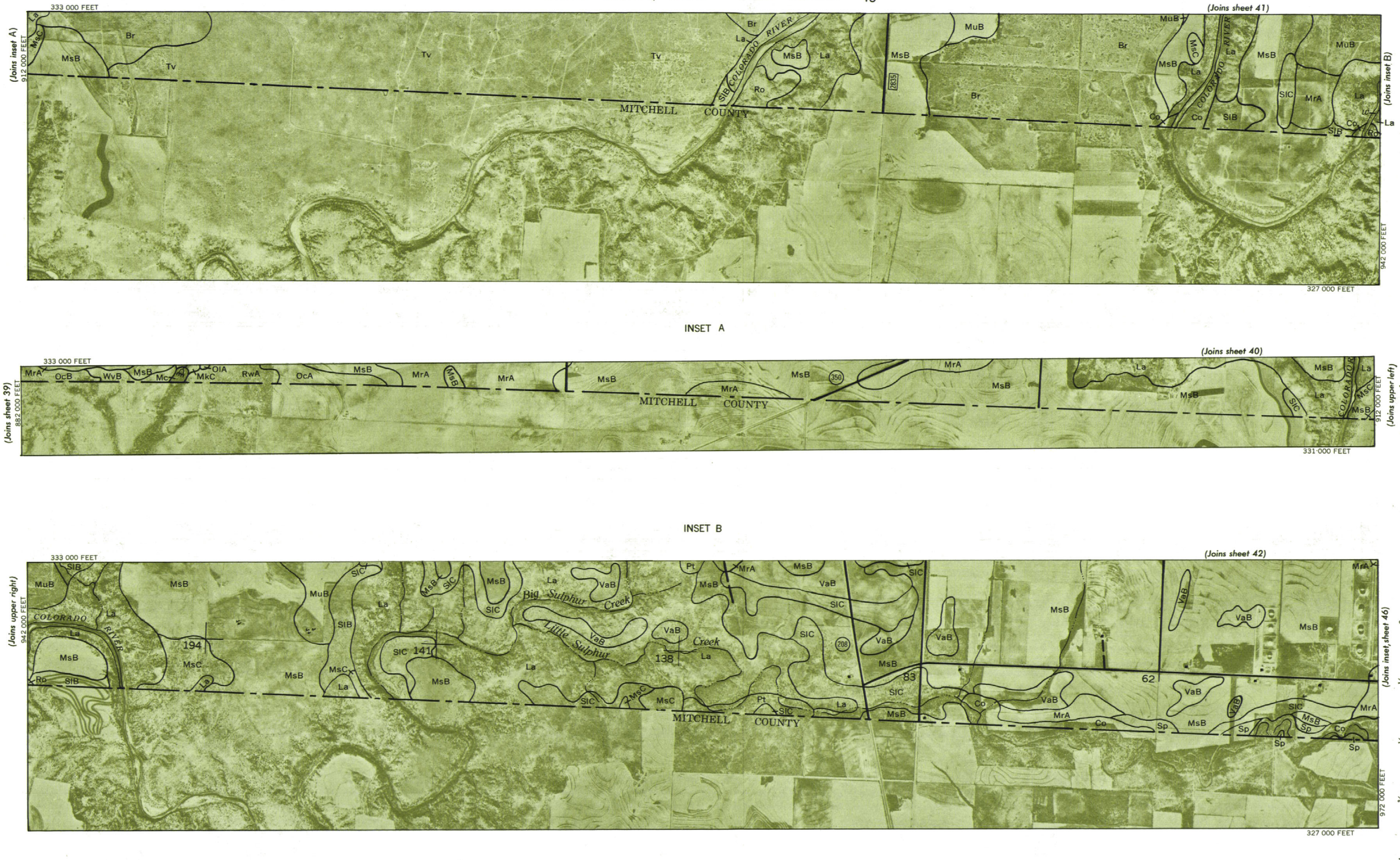
Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.

SCURRY COUNTY, TEXAS NO. 44

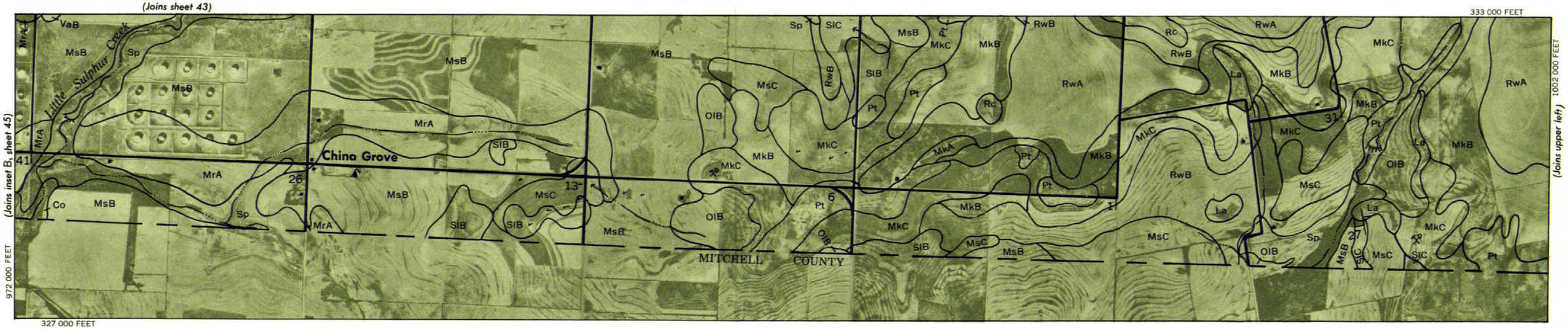
SCURRY COUNTY, TEXAS NO. 45

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.
Land division corners are approximately positioned on this map.



Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.

SCURRY COUNTY, TEXAS — SHEET NUMBER 46



Scale 1:24000

2 Miles 1 ½ 0

10000 Feet 5000 0

Land division corners are approximately positioned on this map.

This map is one of a set compiled in 1972 as part of a soil survey by the United States Department of Agriculture, Soil Conservation Service, and the Texas Agricultural Experiment Station.

SCURRY COUNTY, TEXAS NO. 46

Photobase from 1969 aerial photography. Positions of grid lines are approximate and based on the Texas coordinate system, north central zone.